

## SECTION 2

# Affected Environment

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The LCTIP study area is located in Lake County, Illinois, a part of the Chicago metropolitan region.<sup>1</sup> The Chicago region, comprised of six counties (Cook, DuPage, Kane, Lake, McHenry, and Will), has a diverse economic base. Long known for its industrial activity, the region also houses many corporate headquarters, key educational and research institutions, is the center of the nation's transportation network, and is a major force in financial markets. Located 41.8 km (26 mi) from Chicago's loop and 54.7 km (34 mi) from downtown Milwaukee, Lake County enjoys a strategic geographic position as an entrance to the state and the metropolitan area, and is instrumental in any evaluation of interregional transportation systems. It covers roughly 1,192 km<sup>2</sup> (460 mi<sup>2</sup>), is divided into 18 townships, and includes 52 incorporated cities and villages. For this study, the Benton and Zion townships have been combined, and the Deerfield and West Deerfield townships have been combined due to their small size and proximity (Figure 2-1). Although the study area is slightly larger than Lake County, discussions in this chapter are limited to the county for ease of comparison with values that are commonly aggregated at the county level.

An environmental database, compiled as a geographic information system (GIS) database, was developed specifically for the project to use in considering and evaluating environmental concerns. A separate technical memo (LCTIP 2001a) details how the database was developed, refined, and used for this project. The GIS database consists of almost 80 data layers that were compiled largely from existing digital data obtained from various federal, state, and local sources and agencies (see Appendix A), including:

- IL Department of Transportation (IDOT)

- Regional Transportation Authority (RTA)
- Federal Emergency Management Agency (FEMA)
- Northeastern IL Planning Commission (NIPC)
- IL Department of Natural Resources (IDNR)
- IL State Geological Survey (ISGS)
- IL Historic Preservation Agency (IHPA)
- US Geological Survey (USGS)
- Pace Bus
- US Fish and Wildlife Service (USFWS)
- US National Park Service (USNPS)
- Lake County
- Cook County
- Chicagoland Bicycle Federation (CBF)

Data from these sources was converted into a common coordinate system to facilitate spatial analyses and map creation using a single base. Data was updated and validated on a limited, as-needed basis. Source agencies were consulted about the appropriate use of their data to ensure conclusions were valid based on queries from this database.

## 2.1 Socioeconomic Characteristics

### 2.1.1 Demographics

#### 2.1.1.1 Regional Demographic Trends

The regional population characteristics for the six-county Chicago metropolitan area are

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<sup>1</sup> The regional discussion focuses on those counties in NIPC's jurisdiction. These include Cook, DuPage, Kane, Lake, McHenry, and Will counties.

shown in Table 2-1.<sup>2</sup> Between 1970 and 1990, the region experienced a modest increase in population (an increase of 282,443 people or 4 percent). Between 1970 and 1990, the City of Chicago lost about 585,000 residents, while the suburbs gained nearly 870,000 residents (US Census Bureau 1970-1990); in the suburbs, this population increase trend is forecast to continue in the future. Lake County received the third highest influx of new residents in the region (behind DuPage and suburban Cook counties). During that time, Lake County's population increased 35 percent (adding nearly 134,000 new residents). This trend is forecast to continue in the future, according to NIPC (Lake County Department of Planning, Zoning, and Environmental Quality 1994).

### 2.1.1.2 Population and Households

In 1990, the population in Lake County was 516,418, a 35 percent increase over 1970 population. Table 2-2 (on the following page)

details the population change between 1970 and 1990, and the US Census Bureau 1996 estimates for each township in Lake County.<sup>3</sup>

Between 1970 and 1990, the greatest absolute population increases occurred in the southern and central townships in the county, specifically Vernon, Elmhurst, Libertyville, Warren, and Avon townships, for a combined increase of nearly 110,000 people, or an 82 percent increase in the county population. During the same 20-year period, population losses occurred in the eastern townships of Shields and Deerfield-West Deerfield. Between 1990 and 1996, the trend of population increases continued with the southern and central townships receiving the largest portion of new residents. Over this period, population across the county increased by 66,565 people.

Increasing population, combined with decreasing household size, has led to an increase in the number of households in the county (in 1990, the average number of persons

TABLE 2-1  
Regional Population Trends

	1970	1990	Change 1970–1990	% Change 1970–1990
Chicago Metropolitan Area	6,978,733	7,261,176	282,443	4.0
City of Chicago	3,369,359	2,783,726	(585,633)	(17.4)
Suburban Cook Co.	2,123,010	2,321,341	198,331	9.3
DuPage Co.	491,882	781,666	289,784	58.9
Kane Co.	251,005	317,471	66,466	26.5
Lake Co.	382,638	516,418	133,780	35.0
McHenry Co.	111,555	183,241	71,686	64.3
Will Co.	249,498	357,313	107,815	43.2

Source: US Census Bureau 1970-1990

<sup>2</sup> For this study, the 1990 census detail, which is the most comprehensive and detailed census data available, provides a consistent source for providing a comparison of demographic facts. The 2000 census data is being released over a period of time extending from March 2001 to 2003. As of this publication, 2000 census data is not available at the appropriate level of detail. 2000 census data, however, will be used to a limited extent, where available, to update area trends.

<sup>3</sup> 1996 US Census Bureau estimates are the most recent detailed data available for each township. Section 1, *Purpose and Need*, identified 1999 values; however, this information is only available for the entire county. In this section, 1996 values provide greater insight into location of population changes.

per household in Lake County was 2.96, compared to 3.71 in 1970). Between 1970 and 1990, an estimated 71,019 new households (69 percent increase) were established in Lake County. Similar to population growth, the greatest household increases occurred in the southern and central townships in the county. Vernon Township experienced the greatest influx of households, adding 14,000 new households over the 20-year period. Shields was the only township that declined in number of households from 1970 to 1990, declining by nearly 6,000 households, which was primarily

influenced by the closure of Fort Sheridan Army base that began in 1988.<sup>4,5</sup>

Population growth has also spurred increases in the housing supply in Lake County. The supply of housing in Lake County increased 65 percent between 1970 and 1990, from 110,448 to 183,283 units. About 40 percent of new housing units were built in Vernon, Warren, and Libertyville townships, all in central Lake County (Lake County Department of Planning, Zoning & Environmental Quality 1994).

TABLE 2-2  
Population by Township \*

	1970	1990	1996 Est.	Change 1970–1990	% Change 1970–1990	Change 1990–1996	% Change 1990–1996
Antioch	11,639	18,046	20,466	6,407	55.0	2,420	13.4
Avon	19,953	35,989	50,433	16,036	80.4	14,444	40.1
Benton-Zion	30,866	35,590	39,393	4,724	15.3	3,803	10.7
Cuba	9,097	14,118	15,631	5,021	55.2	1,513	10.7
Deerfield-W. Deerfield	64,459	64,394	66,044	(65)	(0.1)	1,650	2.6
Ela	12,208	32,433	37,161	20,225	165.7	4,728	14.6
Fremont	12,186	14,280	17,388	2,094	17.2	3,108	21.8
Grant	11,007	14,423	15,796	3,416	31.0	1,373	9.5
Lake Villa	11,593	20,764	23,273	9,171	79.1	2,509	12.1
Libertyville	25,577	42,436	47,410	16,859	65.9	4,974	11.7
Newport	2,660	3,561	4,148	901	33.9	587	16.5
Shields	55,093	43,414	39,992	(11,679)	(21.2)	(3,422)	(7.9)
Vernon	12,835	51,141	59,421	38,306	298.4	8,280	16.2
Warren	16,291	34,785	46,169	18,494	113.5	11,384	32.7
Wauconda	10,494	12,859	16,706	2,365	22.5	3,847	29.9
Waukegan	76,680	78,185	83,552	1,505	2.0	5,367	6.9
<b>COUNTY TOTAL</b>	<b>382,638</b>	<b>516,418</b>	<b>582,983</b>	<b>133,780</b>	<b>35.0</b>	<b>66,565</b>	<b>12.9</b>

\* Benton and Zion township data and Deerfield-West Deerfield township data have been combined.

Sources: US Census Bureau 1970 and 1990a, 1996, US Census estimate (US Census Bureau 1997)

<sup>4</sup> Household information is also collected as part of the Decennial Census. Household data includes information on households, including non-family households, single-person households, female-headed families, two-parent families, etc.

<sup>5</sup> The Fort Sheridan base closure was completed by 1993.

Two countywide 2020 population and household forecasts are detailed in Table 2-3. The No-Action forecast assumes a reasonable level of transportation improvements would be made before 2020 (ACG 1999).<sup>6</sup> The “2020 RTP” forecast assumes construction of all transportation projects identified in the RTP under the existing airport improvement scenario.

Under the No-Action Alternative (Baseline), Lake County is forecast to have about 797,000 residents and 290,500 households by 2020. With the No-Action transportation improvements, Lake County’s population will increase by 54 percent (280,500 people) from 1990, and the number of households will increase by 67 percent (116,600 households).

Under the RTP scenario, Lake County’s population is forecast to increase to 826,281 residents (a 3.7 percent increase over the No-Action forecast); the number of households is forecast to increase to 301,531 households (a 3.8 percent increase over the No-Action forecast).

### 2.1.1.3 Age Distribution

Lake County has a younger population than the region, with a median age of 31.6, compared to 32.4 for the six-county Chicago region and 32.8 for the state. The county also has a higher percent of the population that is under 18, a higher percent between 18 and 64, and a lower percent over 65 (see Table 2-4).

**TABLE 2-3**  
Population and Household Forecasts, Lake County

	1990 <sup>a</sup>	2020 Project No-Action Forecast <sup>b</sup>	% Change	Addition to 2020 No-Action Forecast for 2020 RTP Forecast <sup>c, d</sup>	% Change from No-Action Forecast
Population	516,418	796,942	54.3%	29,339	3.7%
Households	173,966	290,569	67.0%	10,962	3.8%

<sup>a</sup> 1990 population and household data: US Census Bureau

<sup>b</sup> ACG 1999

<sup>c</sup> Existing Airport Improvements 2020 Build development scenario (CATS 1997a)

<sup>d</sup> Population contribution of new commuter rail service on the Elgin Joliet and Eastern Railroad is 2,000

**TABLE 2-4**  
Age Distribution, 1990

	Under 18 (%)	18–64 (%)	65 and older (%)	Median Age
Lake County	28	64	8	31.6
Six-County Region	26	63	11	32.4
Illinois	26	62	13	32.8

Source: US Census Bureau 1990a

<sup>6</sup> Representatives from IDOT, ISTHA, RTA, Lake County, Metra, and Pace identified the reasonable set of transportation improvements to be included in the project No-Action (Baseline), including 74 route miles of arterial highway improvements, adding a second track to the NCS rail line, new Metra stations, and other Metra station improvements and Pace bus service improvements (Section 3.3, *No-Action Alternative [Baseline]*).

## 2.1.2 Land Use and Development Trends

Historically, Lake County's communities served as satellite cities or bedroom suburbs of Chicago, as traditional rural crossroads, or as resort towns. As the population increased, growth contributed to the transformation of Lake County communities from small towns to metropolitan suburbs. Over the past 30 years, the central and southern tier areas of Lake County have received the bulk of new residents, shifting population concentrations away from the Lake Michigan shoreline (Lake County Department of Planning, Zoning & Environmental Quality 1994).

In 1990, the largest land uses in Lake County were residential, agricultural, and vacant land. Since 1990, a significant amount of agricultural and vacant land has been converted to residential use. In 1990, agricultural plus vacant land (land

conceivably open to development) accounted for 43 percent of the land use. By 1997, these two categories represented 37 percent of total land use. By 1997, lands devoted to residential use had increased to 36 percent. Table 2-5 summarizes 1990 and 1997 land uses in Lake County.

A substantial part of the developed land lies within the area that encompasses the majority of the proposed transportation improvement alternatives—this area is generally bound by Lake Cook Road on the south, IL 120 to the north, US 41 to the east, and US 12 to the west (Table 2-6, on the following page). In 1990, 44 percent of the lands were devoted to urban land use; by 1997 that number had increased to 51 percent.<sup>7</sup> In 1990, 45 percent of the lands were agriculture or vacant lands; by 1997, this percentage had dropped to 37 percent. Between 1990 and 1997, the amount of lands devoted to residential uses had grown by more

TABLE 2-5  
Land Use Summary

Land Use	1990, ha (ac) <sup>c</sup>	% of Total	1997, ha (ac) <sup>d</sup>	% of Total
Residential	37,800 (93,440)	31%	43,949 (108,638)	36%
Commercial and Services	4,401 (10,880)	4%	4,785 (11,827)	4%
Institutional	3,366 (8,320)	3%	3,381 (8,357)	3%
Industrial	4,143 (10,240)	3%	4,238 (10,476)	3%
Transportation, Communication, Utilities	2,071 (5,120)	2%	2,078 (5,137)	2%
Agriculture	28,221 (69,760)	23%	24,297 (60,060)	20%
Open Space <sup>a</sup>	11,133 (27,520)	9%	11,763 (29,076)	10%
Vacant <sup>b</sup>	24,079 (59,520)	20%	20,650 (51,044)	17%
Water	6,473 (16,000)	5%	6,666 (16,477)	5%
<b>TOTAL</b>	<b>121,687 (300,800)</b>	<b>100%</b>	<b>121,687 (300,800)</b>	<b>100%</b>

<sup>a</sup> Open space land includes recreational uses, such as parks, forest preserves, and golf courses.

<sup>b</sup> Vacant land includes forested and grassland areas, wetlands that exceed 10.1 ha (25 ac), non-residential, and other uses that are available for redevelopment.

<sup>c</sup> Source: NIPC 1990 Land Use

<sup>d</sup> Source: CH2M HILL, GIS Database 1999

<sup>7</sup> Developed lands include residential, commercial, institutional, industrial, transportation, communication, and utilities land uses.

than 2,900 ha (7,180 ac), from 32 to 38 percent of the total land area. The least developed portion of the subarea is between US 45 and US 12, chiefly because of the lack of water and sewers serving the area. Growth is beginning to occur, but will remain somewhat limited until the area is served by public utilities.

Another way to gauge the level of development and land use change is to review building permits. Between 1995 and 1999, permits were issued for nearly 22,200 units throughout Lake County. Table 2-7 identifies the 10 communities that have issued the highest number of residential building permits. Nine of these 10 communities are located in

TABLE 2-6

Land Use Summary by Subarea Bound by Lake Cook Road, IL 120, US 41, and US 12

Land Use	1990, ha (ac) <sup>c</sup>	% of Total	1997, ha (ac) <sup>d</sup>	% of Total
Residential	14,892 (36,800)	32%	17,798 (43,980)	38%
Commercial & Services	1,700 (4,200)	4%	1,874 (4,630)	4%
Institutional	1,060 (2,620)	2%	1,125 (2,780)	3%
Industrial	2,275 (5,620)	5%	2,343 (5,790)	5%
Transportation, Communication, Utilities	595 (1,470)	1%	595 (1,470)	1%
Agriculture	11,546 (28,530)	25%	9,328 (23,050)	20%
Open Space <sup>a</sup>	3,828 (9,460)	8%	4,241 (10,480)	9%
Vacant <sup>b</sup>	9,385 (23,190)	20%	7,916 (19,560)	17%
Water	1,303 (3,220)	3%	1,364 (3,370)	3%
<b>TOTAL</b>	<b>46,584 (115,110)</b>	<b>100%</b>	<b>46,584 (115,110)</b>	<b>100%</b>

<sup>a</sup> Open land space includes recreational uses, such as parks and golf courses.

<sup>b</sup> Vacant land includes forested and grassland areas, wetlands that exceed 10.1 ha (25 ac), residential, non-residential, and other uses that are available for redevelopment.

<sup>c</sup> Source: NIPC 1990

<sup>d</sup> Source: CH2M HILL, 1997 aerial photography update of NIPC data

TABLE 2-7

Top 10 Communities Issuing Residential Permits, 1995–1999

Municipality	Building Permits Issued	Number of Units	Municipality	Building Permits Issued	Number of Units
Gurnee	1,751	2,558	Round Lake Beach	928	1,001
Waukegan	1,371	2,152	Lake Villa	916	919
Grayslake	1,478	1,551	Vernon Hills	891	911
Lindenhurst	1,004	1,384	Buffalo Grove	744	886
Mundelein	1,083	1,251	Round Lake	643	643

Source: US Census Bureau, Manufacturing and Construction Division 1990b.

the northern and north central regions of Lake County.

## 2.1.3 Economic Characteristics

### 2.1.3.1 Employment

In 1970, nearly 60 percent of the region's employment was located in Chicago, with 40 percent in the suburban areas (suburban Cook and the other five counties in the region). By 1990, employment in Chicago represented only 39 percent of total employment in the region; the remaining 61 percent were outside of Chicago. Still, as of 1990, Chicago remains the dominant economic force in the region with the largest share of jobs (Table 2-8).

Lake County's growth includes a substantial increase in the number of jobs and its percentage share of the region's employment. Between 1970 and 1990, employment nearly doubled in Lake County, from approximately 116,000 to nearly 229,000 jobs. This was the second highest percentage increase in jobs in the Chicago region, after DuPage County, and the third highest in terms of absolute number, after suburban Cook and DuPage counties. In 1970, 3.7 percent of the region's jobs were in Lake County; by 1990, the percentage had increased to 5.9 percent.

Table 2-9 (on the following page) provides additional detail on employment trends by township. In 1990, Libertyville, Deerfield-

West Deerfield, Waukegan, Vernon, and Shields contain nearly 70 percent of the jobs in the county. Between 1970 and 1990, employment increased for all townships except Waukegan, which waned primarily due to the decline in heavy industry and manufacturing. Vernon, Libertyville, Warren, Deerfield-West Deerfield, and Elmhurst townships all experienced increases of greater than 10,000 jobs during the 20-year period. These townships account for more than 80 percent of the new jobs to Lake County. The pattern of job growth is similar to that of population growth in that the greatest numerical gains occurred in the southern and central townships.

The Project No-Action forecast (ACG 2001) assumes a modest improvement to the transportation system by 2020, and the RTP forecast (CATS 1997a) assumes construction of all transportation projects identified in the RTP.

Under the Project No-Action forecast, by 2020 Lake County is forecast to have 389,545 jobs, an increase of 70 percent (161,000 jobs) from 1990. Under the RTP forecast, Lake County is forecast to have 393,641 jobs, an increase of 72 percent (165,035 jobs).

### 2.1.3.2 Industries

Employment by industry classification is presented in Table 2-10 (on the following page) for 1980 and 1996.

**TABLE 2-8**  
Regional Employment Trends

	1970	1990	Absolute Change	% Change 1970–1990
Chicago	1,864,000	1,482,381	(381,619)	(20.5)
Suburban Cook	836,300	1,293,652	457,352	54.7
Du Page Co.	146,400	530,322	383,922	262.2
Kane Co.	103,300	145,205	41,905	40.6
Lake Co.	116,350	228,606	112,256	96.5
McHenry Co.	36,300	65,526	29,226	80.5
Will Co.	82,500	99,393	16,893	20.5

Source: NIPC

**TABLE 2-9**  
Employment by Township

	1970	1990	Change (#)	Change (%)
Antioch	2,450	4,561	2,111	86.2
Avon	4,100	8,609	4,509	110.0
Benton-Zion	4,650	6,436	1,786	38.4
Cuba	6,150	9,323	3,173	51.6
Deerfield-W. Deerfield	19,700	34,693	14,993	76.1
Ela	2,500	13,718	11,218	448.7
Fremont	1,500	3,312	1,812	120.8
Grant	1,200	3,688	2,488	207.3
Lake Villa	500	2,968	2,468	493.6
Libertyville	10,800	38,021	27,221	252.0
Newport	700	966	266	38.0
Shields	16,800	20,346	3,546	21.1
Vernon	2,300	28,028	25,728	1,118.6
Warren	3,550	17,599	14,049	395.7
Wauconda	900	4,297	3,397	377.4
Waukegan	38,450	32,041	(6,409)	(16.7)
<b>TOTAL LAKE COUNTY</b>	<b>116,250</b>	<b>228,606</b>	<b>112,356</b>	<b>96.7</b>

1970 data: NIPC 1973

1990 data: NIPC 1997

**TABLE 2-10**  
Employment by Industry

	1980		1996	
	Number	% of Total	Number	% of Total
Agricultural Services, Forestry, Fishing	1,555	0.7 %	6,260	1.7 %
Mining	1,114	0.5 %	627	0.2 %
Construction	8,015	3.8 %	19,649	5.5 %
Manufacturing	44,442	21.2 %	56,748	15.7 %
Transportation, Communication, Public Utilities	6,207	3.0 %	10,785	3.0 %
Wholesale Trade	9,291	4.4 %	21,904	6.1 %
Retail Trade	32,996	15.7 %	58,029	16.1 %
Finance, Insurance, Real Estate	12,284	5.9 %	32,441	9.0 %
Services	41,803	19.9 %	95,614	26.5 %
Federal and Civilian Government	8,359	4.0 %	6,536	1.8 %
Military Government	24,735	11.8 %	24,700	6.9 %
State Government	1,290	0.6 %	1,573	0.4 %
Local Government	17,855	8.5 %	25,781	7.1 %
<b>TOTAL</b>	<b>209,946</b>		<b>360,647</b>	

Source: Bureau of Economic Analysis Data; US Department of Commerce

### 2.1.3.3 Major Employers

Abbott Laboratories in North Chicago is the largest private employer in Lake County, with more than 14,000 employees. Great Lakes Naval Training Center, also in North Chicago, employs 8,500 and is the second largest employer in the county. Currently, the Great Lakes Naval Training center has expanded its mission, which will cause a build-up in military personnel over the next several years. Five hospitals employ more than 1,000 people. Lake County government is a large employer, with more than 2,500 employees. Table 2-11 lists Lake County businesses with 1,000 or more employees. There are several large employers and employment centers dispersed

throughout central and western Lake County. Kemper Insurance, one of the large private employers in Lake County (with about 2,500 employees), is located on IL 22 in Long Grove. Baxter Healthcare, another large Lake County employer (with about 4,000 employees), has a large manufacturing facility on IL 120 in Round Lake. Communities in the southwest quadrant of the county, including Lake Zurich, Barrington, and Wauconda, all have sizeable industrial or business parks. Communities in central Lake County, such as Mundelein, Grayslake, and Round Lake, also have industrial/business parks containing various businesses.

**TABLE 2-11**  
Employment by Industry (Greater Than 1,000 Employees)

Company	Location	Number of Employees
Abbott Laboratories	North Chicago	14,000
Great Lakes Naval Training Center	North Chicago	8,500
Motorola	Libertyville	6,000
Baxter Healthcare	Deerfield and Round Lake	4,000
Six Flags Great America	Gurnee	3,000 (includes seasonal employees)
Allegiance Cardinal Healthcare	McGaw Park	2,700
Kemper Insurance	Long Grove	2,500
Hewitt Associates	Lincolnshire	2,334
Walgreen Co.	Deerfield	1,800
Outboard Marine	Waukegan	1,765
Cherry Electrical Products	Waukegan	1,500
Creative Packaging Corporation	Buffalo Grove	1,500
Highland Park Hospital	Highland Park	1,350
Lake Forest Hospital	Lake Forest	1,280
Victory Memorial Hospital	Waukegan	1,201
Condell Medical Center	Libertyville	1,179
College of Lake County	Grayslake	1,170
Trustmark Insurance Co.	Lake Forest	1,100
W.W. Grainger	Lincolnshire	1,100
Provena St. Therese Medical Center	Waukegan	1,107
Quill Corporation	Lincolnshire	1,000

Source: The Book of Lists, Lake County Business Journal 1999

## 2.1.4 Environmental Justice

The NEPA evaluation process includes consideration of environmental justice to ensure that low-income and minority households and minority business enterprises do not suffer a disproportionate share of adverse effects resulting from federal actions.<sup>8,9</sup> Executive Order 12898 requires federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health and environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations.

### 2.1.4.1 Racial, Ethnic, and Special Groups

According to the 1990 census, 87.4 percent of the county's population is white, 6.7 percent is African-American, 2.4 percent is Asian or Pacific Islander, 0.3 percent is American Indian, and 3.2 percent are classified as other races. Persons of Hispanic origin account for 6.3 percent of the county population. (Hispanic origin is also counted in other categories.) Table 2-12 (on the following page) lists population by township and classification.

The townships of Benton-Zion, Waukegan, and Shields account for nearly 90 percent of the county's African-American population. The townships with 80 percent of the regions Asian population include Deerfield-West

Deerfield, Shields, Waukegan, Warren, Libertyville, and Vernon.

To accurately identify minority or low-income populations in the study area, the US Department of Housing and Urban Development Community Planning software "*Community 2020*" was used, which was based on the 1990 Census data. Based on environmental justice guidelines, each census tract within the study area was examined for racial composition and median household income in comparison to Lake County as a whole. Of the 97 tracts in the county, 31 have a higher percentage of minority populations than the county as a whole. Of those, 25 tracts have a minority population that is at least 20 percent higher than the county percentage (see Figure 2-2). Of the 25 tracts, 18 are in Waukegan or North Chicago and seven are in the bordering communities of Zion, Beach Park, Gurnee, and Park City. Highwood and Mundelein have the only other pockets of minority populations in the study area.

### 2.1.4.2 Income Characteristics

Median household income in Lake County is higher than the State of Illinois. Six of the 18 townships (Antioch, Avon, Benton-Zion [two townships], Wauconda, and Waukegan) have lower median household incomes than the county median. Only Waukegan's median household income is below the state's median. The largest concentrations of persons living below the poverty level are located in Waukegan (10.7 percent), Benton-Zion (9.2 percent), Grant (7.1 percent), and Avon (6.0 percent) townships. On the opposite end of the spectrum, nine townships have median household incomes greater than \$50,000: Cuba, Deerfield-West Deerfield, Elmhurst, Fremont, Libertyville, Newport, Shields, and Vernon.

A census tract evaluation of median family income was performed within the study area to identify low-income populations, as defined by the Department of Health and Human Services (HHS). Overall, the Lake County median household income is high. The \$46,047 income is almost \$13,000 higher than the state average of \$32,252. Since the mean household size for the study area was determined to be

<sup>8</sup> Low-income is defined by the Department of Health and Human Services as those residents living below the defined poverty guideline. For a family of three, the poverty level is \$14,630.

<sup>9</sup> FHWA Order 6640.23 defines minority as "... a person who is: (1) Black (a person having origins in any of the black racial groups of Africa); (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or (4) American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition)."

approximately three persons, the poverty threshold for the study area is \$14,630. No census tracts in the study area were considered to be low-income according to the HHS guidelines. Two census tracts near North Chicago have incomes slightly above this threshold, \$14,900 and \$15,404, but neither tract would be affected by either build alternative.

### 2.1.5 Public Services and Facilities

Public services and facilities consist of schools, churches, cemeteries, police and fire departments, city and township halls, hospitals, and public utilities. They are typically located within municipal boundaries and near population centers.

The public school systems in Lake County are organized into 29 elementary school districts, 10 high school districts, and six community

unit districts. There are 306 public and private schools and 25 colleges and universities in the study area. Waukegan and Shields townships have the greatest number of schools. The concentration of school facilities reflects the population distribution pattern.

Churches or houses of worship are scattered throughout the study area to serve the religious communities of Lake County. This distribution is consistent with the population density pattern. Densely populated Waukegan has the greatest number of churches.

The 66 cemeteries in Lake County are distributed throughout all townships. Avon, Vernon, and Waukegan each have six, while the remaining townships each have two to four cemeteries.

Within Lake County, there are 27 fire departments and 36 police departments serving local communities. Several

TABLE 2-12  
Racial Distribution

Township	Total Population	White	African-American	American Indian, Eskimo or Aleut	Asian or Pacific Islander	Other Race	Hispanic Origin *
Antioch	17,887	99.1	0.1	0.3	0.2	0.3	1.0
Avon	36,073	94.1	0.5	0.3	1.2	3.8	10.5
Benton-Zion	35,579	82.3	13.8	0.3	1.6	2.0	4.8
Cuba	14,192	98.3	0.4	0	1.1	0.2	1.2
Deerfield-W. Deerfield	64,314	94.1	1.8	0	2.6	1.5	4.5
Ela	32,432	97.0	0.8	0	1.8	0.4	2.1
Fremont	14,385	95.6	0.7	0	1.9	1.8	4.8
Grant	14,637	97.9	0.0	0.3	0.5	1.3	2.7
Lake Villa	20,741	97.8	0.9	0.3	0.7	0.4	1.8
Libertyville	42,444	93.0	0.8	0.1	3.7	2.3	6.0
Newport	3,557	98.3	0.0	0.4	0.6	0.6	1.8
Shields	43,479	76.7	17.3	0.5	3.6	1.9	4.1
Vernon	51,074	92.6	1.3	0.1	4.5	1.6	3.6
Warren	34,644	92.2	2.9	0.5	3.2	1.2	3.8
Wauconda	12,808	97.6	0.1	0.3	0.5	1.5	4.2
Waukegan	78,172	61.3	23.4	0.5	2.5	12.3	22.6
<b>LAKE COUNTY TOTAL</b>	<b>516,418</b>	<b>87.4</b>	<b>6.7</b>	<b>0.3</b>	<b>2.4</b>	<b>3.2</b>	<b>6.3</b>

\* Rows do not total 100 percent because persons of Hispanic origin are also counted in other categories.  
Source: US Census Bureau 1990a

communities share fire-fighting services, and the Lake County Sheriff's Department provides coverage for unincorporated areas.

The 11 hospitals in Lake County are located in seven of the 16 townships. Shields and Waukegan townships both have three hospitals, while Avon, Benton, Cuba, Deerfield, and Libertyville townships each have one hospital.

Public utilities include facilities for distributing energy, such as electricity and natural gas, as well as water supplies and wastewater treatment plants (WWTP). Drinking water in Lake County is primarily obtained from Lake Michigan and serves 80 percent of households. Nineteen municipal WWTPs serve the wastewater needs of Lake County. Wastewater treatment is provided by regional treatment plants, the North Shore Sanitary District, or septic systems. These systems are dependent upon population distribution and area infrastructure development. In general, the WWTPs are associated with the population centers within Lake County, except in the west-central and northern portions. According to the Lake County Health Department, Environmental Health Division, 15 to 20 percent (30,000 residents) are on private septic systems. Figure 2-3 depicts the sewerage areas of Lake County.

There are six electric substations and 83 high-voltage power transmission lines (142 km, or 88 mi, total length) located in the study area. Warren Township has the most, with 15 lines. A power transmission line corridor traverses the study area north-south through Wheeling, Vernon, Libertyville, Warren, and Newport townships. Another power transmission line corridor extends east-west across the study area through Algonquin, Nunda, Wauconda, Fremont, Avon, Libertyville, Warren, and Waukegan townships (LCTIP 1999).

## 2.1.6 Transportation Facilities

The major regional transportation systems of Lake County include an established roadway system, passenger and freight rail, water

transportation, and airports. Bicycle routes and pedestrian paths are available transportation alternatives. Metra and Pace provide public transportation service in Lake County; both are operating divisions of RTA. Figure 2-4 shows these facilities within Lake County.

### 2.1.6.1 Existing Roadways

The roadway network in the study area evolved from early trails and pre-automobile routes that followed natural topography and contours. Barriers, such as the Des Plaines River and the railroads, have also influenced the development of the existing roadway network. The existing roadway network east of the Tri-State Tollway corresponds to a more traditional, well-defined grid system. However, west of the Tri-State Tollway, the network is less orderly; it is made up of a combination of east-west, north-south, and diagonal routes. In this area, there is less route continuity with sporadic spacing of roadways. Many routes have relatively short lengths. By virtue of the nature of the roadway network, west of the Tri-State Tollway, travel tends to be more circuitous with limited travel route choices.

With travel mobility as their primary purpose, fully or partially access-controlled facilities run along the east (I-94 and US 41) side of Lake County. A barrier wall or open median separates the opposing traffic lanes of these facilities. I-94 is a 6-lane facility, and US 41 is a 4-lane facility.

Principal arterials generally run for long distances and provide for mobility while also providing local access. Principal arterials in the eastern part of Lake County are both 2 and 4-lane roads. With a few exceptions, principal arterials in the central and western parts of the county are 2-lane roads (See the *Transportation System Performance Report*). Table 2-13 (on the following page) lists roadway functional classes. About 50 percent of all travel miles occur on freeways and principal arterials, which make up 26 percent of the total route miles.

The Chicago metropolitan region is one of the largest hubs for intermodal shipments in the nation. Local rail-to-highway freight transfers serve the entire Midwest. I-94 is a major

north-south cargo movement corridor through Lake County.

### 2.1.6.2 Existing Rail Network

Chicago is one of the largest rail hubs in the Midwest. Similar to roadways, a distinctive radial rail network is evident; part of the rail network passes through Lake County, with several rail lines appearing as “spokes” on the Chicago hub of yards and freight terminals (Figure 2-4). These railroads are the Union Pacific (UP) North and Northwest Lines, the Wisconsin Central (North Central Service [NCS]) Line, the Milwaukee District (MD) North Line, the Canadian Pacific (CP) Line, and the UP Freight Line. The Elgin, Joliet, and Eastern (EJ&E) is a circumferential belt line, running through many middle and outer suburbs. The rail lines in the study area are used by freight trains, and most are used for commuter rail.

Three Metra commuter rail lines operate in Lake County: the UP North Line, the MD North Line, and the NCS. Table 2-14 shows the service levels provided by Metra during 1997 on the three lines. The UP Northwest Line serves neighboring communities to the south and west but has no stations within Lake County. Table 2-14 shows that most daily trips on Metra occur during the peak 2-hour travel periods in the direction of Chicago commuter travel (southbound in the morning and northbound in the evening). In 1996, 10 percent of the residents in the larger study area (all of Lake County and portions of eastern McHenry and northern Cook counties) were within 0.8 km (0.5 mi) of a Metra station and over 30 percent of the residents were within 1.6 km (1 mi) (Table 2-15, on the following page).<sup>10</sup> Overall, rail transit is used in Lake County for approximately 3.7 percent of all work trips.

TABLE 2-13

Route Miles and Lane Miles in Lake County by Functional Class

Functional Class	Route Miles	% of Route Miles	Lane Miles	% of Lane Miles
Freeway/Tollway	36.3	3.4%	203.0	7.5%
Principal Arterial	243.0	22.4%	716.0	26.5%
Minor Arterial	329.2	30.4%	808.9	29.9%
Collector	310.7	28.7%	646.4	23.9%
Local *	163.7	15.1%	331.6	12.3%
<b>ALL CLASSES</b>	<b>1,082.9</b>	<b>100.0%</b>	<b>2,705.8</b>	<b>100%</b>

\* CATS network only includes a portion of local roads (e.g., the network does not include local roads within a subdivision)

Source: CATS 1998

TABLE 2-14

Metra Service Information

Rail Line	No. of Lake Co. Stations	Weekday Lake Co. Boardings	No. of Weekday Trains	Ridership in Peak Period/Direction (% of Total Riders)	Weekend Service
UP North	12	4,640	56	66	Y
MD North	9	5,080	58	76	Y
NCS	8	1,565	10	97	N

<sup>10</sup> All of Lake County and portions of eastern McHenry and northern Cook counties.

The study area is well served by rail transit. Despite figures that show transit is serving a smaller portion of total work trips than 20 years ago, between 1987 and 1997 actual commuter rail ridership grew approximately 30 percent in the Lake County, no doubt reflecting both increased service and population growth. Furthermore, with the growth of employment in the study area, reverse commutes have grown 32 percent (approximately 3,517 total trips on an average weekday) since 1991.

Amtrak has routes that run from Chicago to Milwaukee and destinations further north and west. The Amtrak route in the study area uses the Metra MD North Line and CP Line tracks. There are no station stops within Lake County; the nearest stop to the study area is in Glenview, approximately 9.7 km (6 mi) south of Lake County.

### 2.1.6.3 Other Modes of Transportation

**Bus and Related Services.** Pace is the RTA's suburban bus division, providing a combination of fixed-route, dial-a-ride, and paratransit service. Connecting fixed-route bus services are provided at 29 of the 46 Metra rail stations in the larger study area.<sup>11</sup> Thirteen stations have only one route providing service and 16 stations

have two or more routes. Of the stations served, access by bus ranges from 2.5 to 5.8 percent. Pace also operates smaller buses called "Shuttle Bugs" to serve the large employment area along the Lake Cook Corridor. The average weekday ridership for the Pace system was about 13,000 in 1998, with about 38 percent on Waukegan routes. In 1996, more than half of the residents in the larger study area (all of Lake County and portions of eastern McHenry and northern Cook counties) lived within 0.8 km (0.5 mi) of a Pace route (Table 2-16, on the following page). Overall, bus transit is used in Lake County for about 0.5 percent of all work trips.

**Air Transportation.** Two general aviation airports, Waukegan Regional Airport and Campbell Airport, serve Lake County. The Waukegan Regional Airport in Waukegan Township is a designated reliever for O'Hare Airport. Campbell Airport is a privately-owned general aviation airport located in Avon Township, near the Village of Round Lake Park. Outside Lake County, Chicago's O'Hare and Midway and Milwaukee's General Mitchell airports all serve commercial air travelers throughout the Chicago region and Lake County. Palwaukee, Waukegan (in Lake County), and DuPage County airports focus on

TABLE 2-15

Distance to Metra Service in the Larger Study Area<sup>a</sup>

Distance from Transit	Population		
	1990	1996	2020 <sup>b</sup>
Within 0.8 km (0.5 mi) of Metra	71,574 10%	82,595 10%	84,748 8%
Within 1.6 km (1 mi) of Metra	218,459 30%	251,777 31%	267,120 27%
Within 8 km (5 mi) of Metra	696,126 97%	790,700 97%	967,133 96%

<sup>a</sup> The larger study area includes all of Lake County and adjacent portions of McHenry and Cook counties.

<sup>b</sup> Existing Airport 2020 RTP No-Build development scenario.

Source: NIPC

<sup>11</sup> All of Lake County and portions of eastern McHenry and northern Cook counties. Also includes Metra service to Kenosha, WI in southern Kenosha County.

corporate flights. Campbell Airport, in central Lake County, serves only private planes.

**Pedestrian and Non-Motorized Facilities.** Lake County has 933 km (580 mi) of existing on-road bicycle routes, and over 113 km (70 mi) of off-road bicycle trails and paths (CBF 1999). An additional 402 km (250 mi) are proposed for implementation by municipality and county governments.

## 2.2 Agriculture

According to the *Illinois Agricultural Statistics Annual Summary 2000*, Illinois is rich with agricultural resources and is recognized as a world supplier of food. Illinois is a strong agricultural resource because of its fertile soil and favorable climate. In 1999, Illinois ranked second among all states in the production of corn and soybeans. Other agricultural resources in Illinois that are not as prominent include wheat, sorghum, hay, livestock, and dairy production.

When comparing all Illinois counties, La Salle County is ranked first among all Illinois counties with 1,581 farms, while Lake County ranked 91 out of 102 with 335 farms.

Lake County is not a large producer of either corn or soybean crops. In fact, Lake County ranks 94 in corn crop production and 97 in soybean crop production. Illinois counties that lead in the production of corn included McLean (51,278,500 bushels), Iroquois (48,654,000 bushels) and Champaign (44,986,000 bushels). Lake County produced only 1,440,600 bushels of corn in 1999.

Illinois counties that lead in the production of soybeans included McLean (16,105,000 bushels), Iroquois (14,435,400 bushels), and Champaign (13,525,200 bushels). Comparably, Lake County produced only 176,000 bushels of soybeans. Ultimately, Lake County is not a major contributor to the production of any agricultural resource.

### 2.2.1 Locations of Agricultural Land

Existing agricultural land locations in Lake County are shown in Figure 2-5. The highest concentrations of land under current agricultural use are in the north-central, northwest, and west portions of Lake County. Table 2-17 (on the following page) provides a breakdown of existing agricultural land areas by township in Lake County. Townships along Lake Michigan have very little agricultural land. Overall, 20 percent of Lake County's land area was in agricultural use in 1997.

Farmland in Lake County has been rapidly replaced by suburban housing development. Statewide, the land area devoted to farming has been reduced by 11.7 percent in the past 47 years. The land area devoted to farming in Lake County has declined in every agricultural census since 1950 (Illinois Department of Agriculture 1999). Lake County lost about 71 percent of its farmland, or six times the percentage lost statewide. In 1950, 70,011 ha (173,000 ac) were devoted to farmland; the number dropped to 24,306 ha (60,061 ac) in 1997 (US Census Bureau 1950, LCTIP 1999). The average farm

**TABLE 2-16**  
Distance to Metra Service in the Larger Study Area<sup>a</sup>

Distance from Transit	Population		
	1990	1996	2020 <sup>b</sup>
Within 0.8 km (0.5 mi) of Pace	415,233 58%	468,631 57%	499,489 50%

<sup>a</sup> The larger study area includes all of Lake County and adjacent portions of McHenry and Cook counties.

<sup>b</sup> Existing Airport 2020 RTP No-Build development scenario.

Source: NIPC

size in Lake County in 1997 was 62 ha (152 ac). Figure 2-6 provides information on crop production. The total market value of Lake County agricultural products sold in 1997 was \$35,637,000. Crop sales accounted for 92 percent of Lake County agricultural cash receipts in 1997; livestock made up the remaining 8 percent. Smaller specialty farms also exist in Lake County, with landscape nurseries and apple orchards being the most common.

## 2.2.2 Prime and Important Farmland

The US Department of Agriculture–Natural Resources Conservation Service (USDA–NRCS) has divided farmland into four categories to describe aspects of resource value: prime farmland, unique farmland other than prime, farmland of statewide importance, and farmland of local importance. Based on review of representative soil maps of parts of Lake

County that are in agricultural production, approximately 85 percent of the land areas are classified as prime farmland, with most of the remainder being important farmland.

The prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. It may exist as cropland, pastureland, rangeland, forestland, or other land not designated in urbanized areas or in bodies of water. Prime farmland produces the highest yields when treated and managed according to acceptable farming methods. In addition, the USDA–NRCS has identified farmland other than prime that is of statewide importance because of its value in the production of food, feed, forage, and oilseed crops. These areas are designated as “important farmland.”

TABLE 2-17  
Existing Agricultural Land Within Lake County, 1997

Township	Agricultural Land Area, ha (ac)	Total Land Area, ha (ac)	Portion of Land In Agriculture
Antioch	2,647 (6,542)	10,850 (26,811)	24.4%
Avon	1,578 (3,900)	6,175 (15,258)	25.6%
Benton-Zion	848 (2,095)	6,058 (14,970)	14.0%
Cuba	688 (1,700)	6,283 (15,525)	11.0%
Deerfield-W. Deerfield	174 (429)	7,728 (19,096)	2.3%
Ela	1,638 (4,048)	9,299 (22,977)	17.6%
Fremont	3,526 (8,713)	9,277 (22,923)	38.0%
Grant	894 (2,209)	5,963 (14,735)	15.0%
Lake Villa	1,709 (4,223)	6,731 (16,633)	25.4%
Libertyville	1,328 (3,281)	9,458 (23,372)	14.0%
Newport	4,105 (10,143)	8,714 (21,532)	47.1%
Shields	184 (455)	4,603 (11,374)	4.0%
Vernon	594 (1,467)	9,413 (23,259)	6.3%
Warren	1,705 (4,212)	9,506 (23,489)	17.9%
Wauconda	2,663 (6,581)	6,263 (15,475)	42.5%
Waukegan	25 (63)	5,505 (13,604)	0.5%
<b>TOTALS FOR LAKE COUNTY</b>	<b>24,306 (60,061)</b>	<b>121,826 (301,033)</b>	<b>20.0%</b>

Source: CH2M HILL 1997 aerial photography update of NIPC data

## 2.3 Natural Resources

### 2.3.1 Geological Setting

#### 2.3.1.1 Surficial Geology and Topography

With the retreat of the glacial system, thick layers of glacially deposited soil (glacial “drift”) covered most of Lake County. The drift was mostly in the form of relatively high north-south oriented end moraines separated by low ground moraines. The soil of this undulating topography of ridges and lowlands consisted of glacial drift with lenses of clay, silt, sand, gravel, and scattered humic and wood deposits. A diverse vegetative cover formed throughout the area. A savanna of prairie grass and burr oak formed on the ridges of the end moraine. As the terrain descended to the ground moraine, prairies covered the landscape. Scattered throughout this prairie between the ridges were lakes and wetlands. In some locations where drainage ways had formed between the ridges, wooded floodplains were established. The major near-surface moraines and morainic systems include the Valparaiso System (undifferentiated), the Tinley Moraine, and the Lake Border Morainic System and associated ground moraine (Willman 1971).

Within the moraine systems, sand and gravel deposits were left by glacier meltwater, rivers, streams, and outwash plains. These sand and gravel aquifers are associated with the Des Plaines River Valley and the hills and ridges of western Lake County. Deposits also appear in the vicinity of Channel Lake and Lake Moraine in northwestern Lake County. Figures 2-7 and 2-8 depict the location of these sand and gravel deposits.

Sediments deposited in the deep water of ancient glacial lakes are another defined group of geologic materials in Lake County. These lake sediments consist of silt, sand, gravel, and clay deposits. Sediments were deposited in a quiet water environment and contain well-bedded silt, thin beds of clay (which has given way to a large wetland region), and lenses of sand and gravel along the former beaches.

Extreme north central and southwestern Lake County contains extinct lakebeds of the Equality Formation. A 1.6 km (1 mi) wide band of Equality Formation lake sediment lies 3.2 km (2 mi) inland from Lake Michigan.

The glaciers shaped the western half of Lake County. The rough topography of the kame and kettle landscape contains additional ridges (eskers), knobs, and terraces. Drainage on these surfaces is poor and abundant peat deposits have formed. The deposits continue through the Tinley Moraine region where the presence of lakes nearly ceases.

To the east in Lake County, the Des Plaines River and tributary valleys dissect the Lake Border Morainic System and parts of the Tinley Moraine. The river has developed a sandy floodplain along which numerous outwash terraces can be found. Outwash terraces consist of sediments deposited anciently by streams and rivers that flowed out of the rapidly melting glacial ice. East of the Des Plaines River valley, the terrain flattens and gently descends into Lake Michigan.

The highest elevation in Lake County is Gander Mountain (northwest Lake County) and the lowest elevation is southeast near the Des Plaines River and Cook County borders.

The soils in Lake County fall into two taxonomic soil categories: mollisols and alfisols. Mollisols are organic rich soils, while alfisols are a clay rich brown to gray-brown soils. Compressed clays, undisturbed by activity, exhibit good engineering properties.

#### 2.3.1.2 Bedrock and Structural Geology

Lake County is situated on the northeastern flank of the gently sloping Kankakee Arch, where the surface bedrock formation dips easterly at 1.8 to 2.8 m/km (10 to 15 ft/mi) (Woller and Gibb 1976). Paleozoic in origin, the Kankakee Arch is linked to the Wisconsin Arch to the northwest and the Cincinnati Arch to the southeast. Bedrock formations are not naturally exposed in Lake County as it was covered by glacial drift 27 to 92 m (90 to 300 ft) thick during the most recent Wisconsin glacial episode. Figure 2-9 shows a complete columnar section of the bedrock units present in Lake County.

The upper or “surface” bedrock in Lake County consists of sedimentary rocks such as dolomite and shale. In a small area of western Lake County, the Silurian dolomite has eroded and underlying rock from the Ordovician age Maquoketa Group is exposed. These rocks vary in thickness from less than a few centimeters in western Lake County to more than 61 m (200 ft) in southeastern Lake County. The shallow dolomite produces water in varying quantities depending on the presence of water-bearing sands in the overlying drift. The shallow dolomite aquifer is separated from deeper aquifers by the shales of the Maquoketa Group, which range in thickness from 30.5 m (100 ft) in the south to 76 m (250 ft) in the west-central area and are not considered a water source (Woller and Gibb 1976). Below the shale is the Cambrian-Ordovician aquifer, a group of hydrologically connected rocks. Figure 2-10 shows the thickness and slope of bedrock strata from Island Lake to Lake Bluff (Woller and Gibb 1976). The bedrock is intact below the surface weathered zone, can support significant loads, and provides a suitable base for most construction projects, including bridge foundations and highway piers.

The nearest known fault to Lake County is the Sandwich fault, located about 80 km (50 mi) southwest of the county. The fault is about 193 km (120 mi) long, running from Ogle to Will counties. Seismic activity in Lake County is as low as it is in most of Illinois except for the southern extremities of the state. Other natural land use hazards in the county are flooding and wetlands, which are discussed later in this document.

### 2.3.1.3 Mineral Resources

As of 1992, Lake County ranked 39 in Illinois out of 102 counties based on total value of minerals extracted, processed, and manufactured (Samson and Masters 1992), with sand, gravel, and peat the top minerals extracted. There are no quarries in Lake County. Figures 2-7 and 2-8 depict the distribution of these operations in Lake County. As a result of its glacial history, Lake County contains many locations for the commercial

mining of sand and gravel. There are two geologic features associated with these mining operations: the Henry Formation along the Des Plaines River Valley, and the hills and ridges (kames and eskers) west of the Des Plaines River in west-central Lake County. In Illinois and in Lake County, valley trains and outwash plains are the primary source of construction sand and gravel. As of 1992, nine sand and gravel pit locations under six ownerships were active. Lake County produces sand and gravel of all classes. Sand and gravel units mined include Henry, Wasco, Mackinaw, Batavia, and Wedron.

Peat, a dark brown to black residuum of decaying marsh plants, is harvested primarily for horticultural and agricultural purposes, but is occasionally sold in bulk for earthworm cultivation. As of 1992, two of the four companies in Illinois producing peat commercially were in Lake County. Dahl Enterprises and Roots Peat Farm harvest three types of peat (reed sedge, moss, and peat humus) under the broad classification of Grayslake Peat (Samson and Masters 1992). The Volo bog area of Lake County is a textbook example of a peat forming marsh environment.

### 2.3.1.4 Groundwater Resources

There are four aquifer systems in northeastern Illinois (NIPC 1976). The aquifers are sand and gravel deposits in glacial drift, shallow dolomite limestone formations, Cambrian-Ordovician or deep sandstone aquifer, and the Mt. Simon aquifer. In Lake County, the glacial drift ranges in thickness from 27 m (90 ft) in the southeastern region to more than 91 m (300 ft) in the west-central region. According to the United States Environmental Protection Agency (USEPA) web site (<http://www.epa.gov/ogwdw/swp/sumssa.html>), as of February 1, 2001, there are no sole source aquifers in Illinois.

The ISGS also publishes a map titled *Potential for Contamination of Shallow Aquifers from Land Burial of Municipal Wastes* (Berg et al. 1984). The map (Figure 2-11) indicates that Lake County is considered to have a relatively low potential for aquifer contamination; up to

15 m (50 ft) of silty clay materials occur in surficial deposits. Exceptions to this geology in Lake County are the Des Plaines River channel, the northern half of the county along Lake Michigan shoreline, and the area adjacent to the Chain O' Lakes. These areas of sand and gravel deposits all have higher potential for aquifer contamination than the rest of the county.

As of 1990, 19 percent of the homes in Lake County used well water for their water supply (*Lake County Framework Plan*, Lake County Department of Planning, Zoning & Environmental Quality 1994). The 19,600 private water supply wells in Lake County typically withdraw from the shallow glacial drift aquifer or the shallow dolomite aquifer system. The two shallow aquifers are both recharged by precipitation (Hughes et al. 1966). The primary threat to the shallow aquifer systems is associated with watershed contamination due to runoff from urbanization (Lake County Department of Planning, Zoning & Environmental Quality 1994).

The public and community supply wells in Lake County typically range from 15 to 457 m (50 to 1,500 ft). The shallow wells are set in sand and gravel, the mid-range wells are set in Silurian dolomite, and the deep wells are set in the Cambrian-Ordovician aquifer (Woller and Gibb 1976). In 1976, there were 199 public wells in Lake County (Woller and Gibb 1976). Currently, there are 115 community supply wells and 24 municipal supply wells (CH2M HILL, GIS Database 1999). Only about 8,000 homes are supplied by public supply wells in Lake County; 4,000 are in the Wildwood and Vernon Hills service areas and the rest are scattered throughout Lake County (Lake County Department of Planning, Zoning & Environmental Quality 1994).

## 2.3.2 Water Quality and Water Resources

### 2.3.2.1 Surface Water Resources

The three watersheds in the study area include the Fox River, Des Plaines River, and Lake Michigan. These watersheds parallel each other and run in a north to south direction.

Figure 2-12 shows all three watersheds. Information from the Illinois Environmental Protection Agency (IEPA), Illinois Natural History Survey (INHS), and Illinois Department of Natural Resources (IDNR) provided a characterization of these three watersheds.

In Illinois, General Use Water Quality Standards (Title 35, Subtitle C, Part 302, Subpart A) protect waters of the state (streams and rivers) for indigenous aquatic life, agricultural use, primary and secondary use, and institutional use. All water quality data were compared to the General Use Water Quality Standards.

Stream quality is assessed using both the chemical and physical data along with biological data. The predominant stream quality indicator used in the IEPA and IDNR's Biological Stream Characterization (BSC) (Bertrand 1996) is the Index of Biotic Integrity (IBI), an index for describing the health or integrity of the fish community.

The IEPA annually assesses the streams for fish consumption and overall, aquatic life, swimming, drinking water supply, and secondary contact uses. Table 2-18 (on the following page) summarizes the classification systems and gives a comparison of the BSC and the USEPA classifications.

**Fox River Watershed.** The Fox River originates in Wisconsin on the west side of Milwaukee and flows southwest before entering Illinois at the northwest corner of Lake County. It flows generally south before merging with the Illinois River in Ottawa. The Fox River is 185 km (115 mi) long from the state border to the confluence with the Illinois River. The Upper Fox River Watershed is situated in Lake, McHenry, Cook, Kane, and DuPage counties.

The segment of the Upper Fox River from Algonquin to the Wilmot Dam in Wisconsin is listed as a candidate for the National Wild and Scenic Rivers, and therefore is considered a Class 1 stream in this area. The length in river miles from the Wisconsin-Illinois state border to just south of Elgin (the

beginning of the Lower Fox River) is 74 km (46 mi).

The study area for the project includes 53 km (33 mi) of the Upper Fox River and 694 km<sup>2</sup> (268 mi<sup>2</sup>) of watershed. Table 2-19 (on the following page) lists the 16 subbasins in the Fox River study area and presents physical characteristics and biological classifications.

Water quality data was obtained from Fox River AWQMN stations DT 35, DT 22, and DT 06 and Nippersink Creek AWQMN station DTK 04. Comparison of the water quality data obtained from IEPA (1996 and 1998) to the General Use Water Quality Standards indicates there have been no violations of the standards with the exception of fecal coliform and dissolved oxygen (USEPA 1999).

Segments of the Fox River from Flint Creek to McHenry Dam and Ferson to Poplar Creek are listed on the Section 303(d) list of water quality impaired streams.

Stream uses within the watershed range from full support (Nippersink Creek, Upper reaches of the Fox River, and Poplar Creek) to partial support (a segment of the lower Fox River and Cotton Creek). Nutrient and ammonia loads were attributed to less than full support assessment (IEPA 2000b). There are no state

listed species expected to be in any of the streams within the Fox River Watershed portion of the study area. No individual live mussels have been collected in the study area within 50 years.

There are roughly 52 km<sup>2</sup> (20 mi<sup>2</sup>) of lake coverage in the Fox River Watershed. Cedar Lake has been identified as a biologically significant waterbody due to the observation of four threatened fish species in this lake, including the state threatened Iowa darter (*Etheostoma exile*) (Page et al. 1991). Other water bodies in the study area include Cross Lake, Deep Lake, East Loon Lake, West Loon Lake, Bangs Lake, Sullivan Lake, Wooster Lake, Lily Lake, Turner Lake, Round Lake, and Grays Lake.

**Des Plaines River Watershed.** The Des Plaines River originates in Wisconsin, south of Union Grove. The river enters Illinois in the northeast corner of Lake County and flows south through Lake and Cook counties. The Des Plaines merges with the Kankakee River near Channahon, Illinois (Will County) to form the Illinois River. The entire Des Plaines River Watershed covers 345,874 ha (854,669 ac) in Lake, Cook, DuPage, and Will counties. From the Wisconsin-Illinois border to the junction with the Kankakee River, the river is 176.9 km

TABLE 2-18

Summary of the Classification Systems and Comparison of the BSC and the USEPA Classifications

USEPA Classification	General Description	IEPA/IDOC Biological Stream Characterization	IBI Result <sup>a</sup>	MBI Result <sup>b</sup>
Full Support	Good	Unique Aquatic Resource (Class A)	51–60	<5.0
Full Support	Good	Highly Valued Resource (Class B)	41–50	5.0–5.9
Partial Support (Minor)	Fair	Moderate Aquatic Resource (Class C)	31–40	6.0–7.5
Partial Support (Moderate)	Fair	Limited Aquatic Resource (Class D)	21–30	7.6–8.9
Non-Support	Poor	Restricted Aquatic Resource (Class E)	<20	>8.9

<sup>a</sup> Index of Biotic Integrity (IBI) evaluates stream quality at the community level using 12 metrics encompassing trophic composition, abundance and condition of the fish community.

<sup>b</sup> Macroinvertebrate Biotic Index (MBI) evaluates stream quality and is calculated using the numerical rating of each taxon developed by the IEPA (1989). The formula for the index is:

$$MBI = \frac{\sum(n_i t_i)}{N}$$

Where  $n_i$  = number of individuals in each taxon  $i$   
 $t_i$  = tolerance value for taxon  $i$   
 $N$  = number of individuals

(109.9 mi). The study area includes 62 km (38 mi) of the Des Plaines River and 616 km<sup>2</sup> (238 mi<sup>2</sup>) of watershed.

Included in the Des Plaines River system is the West Fork North Branch Chicago River (West Fork), the Middle Fork North Branch Chicago River (Middle Fork), and the Skokie River. The North Branch Chicago River originates east of Libertyville as the Middle Fork. This stream flows south through Lake and Cook counties before merging with the Skokie River in Northfield. The Skokie River originates near North Chicago in Lake County

and subsequently merges with the West Fork near Morton Grove. The river at this point then becomes the North Branch Chicago River.

The Des Plaines River is predominantly pools and glides with stream widths from 18 m (60 ft) in Lake County to 183 m (600 ft) in Will County. The river bottom is mainly bedrock covered with sand and gravel. About 31 km (20 mi) of the river have been channeled in Lake and Cook counties (Page et al. 1991).

**TABLE 2-19**

Fox River Watershed Basins

<b>Drainage Basin</b>	<b>Streams within Basin</b>	<b>Drainage Area, km<sup>2</sup> (mi<sup>2</sup>)</b>	<b>Total Stream, km (mi)</b>	<b>Stream, km (mi)</b>	<b>Flow Characteristics</b>	<b>BSC Aquatic Resource Class</b>	<b>IEPA<sup>a</sup> Use Assessment</b>
Nippersink Creek	Nippersink Creek	56.56 (21.84)	63.2 (39.3)	15.0 (9.3)	Perennial	Highly Valued	Full Support
Upper Fox River	Fox River	86.7 (33.49)	185 (115)	36.2 (22.5)	Perennial	Moderate to Highly Valued	Full Support
Sequoit Creek	Sequoit Creek	39.5 (15.25)	12.1 (7.5)	12.1 (7.5)	Perennial	Limited	Not Rated
Dutch Creek	Dutch Creek	17.38 (6.71)	6.6 (4.1)	3.2 (2.0)	Intermittent and Perennial	Moderate	Not Rated
Lower Fox River - 1	Fox River	100.65 (38.86)	185 (115)	18.3 (11.4)	Perennial	Moderate	Full Support
Fish Lake Drain	Fish Lake Drain	22.14 (8.55)	4.0 (2.5)	4.0 (2.5)	Perennial	Not Rated	Not Rated
Squaw Creek	Squaw Creek Eagle Creek	98.67 (38.10)	24.6 (15.3) 2.1 (1.3)	24.6 (15.3) 2.1 (1.3)	Perennial Perennial	Highly Valued	Not Rated Full Support
Boone Creek	Boone Creek	2.62 (1.01)	21.9 (13.6)	1.6 (1.0)	Perennial	Highly Valued	Full Support
Mutton Creek	Mutton Creek Cotton Creek	34.58 (13.35)	6.3 (3.9) 4.2 (2.6)	6.3 (3.9) 4.2 (2.6)	Perennial Perennial	Moderate	Not Rated PS <sup>b</sup>
Sleepy Hollow Creek	Sleepy Hollow Creek	7.8 (3.01)	12.9 (8.0)	5.3 (3.3)	Perennial	Limited	Not Rated
Lower Fox River - 2	Fox River	69.9 (26.99)	185 (115)	20.4 (12.7)	Perennial	Moderate	Full Support
Slocum Lake Drain	Slocum Lake Drain	29.03 (11.21)	NA	NA	Perennial	Not Rated	Not Rated
Tower Lake Drain	Tower Lake Drain	19.04 (7.35)	NA	NA	Perennial	Not Rated	Not Rated
Flint Creek	Flint Creek	90.47 (34.93)	22.5 (14.0)	22.5 (14.0)	Perennial	Limited	Full Support
Spring Creek	Spring Creek	16.37 (6.32)	20.8 (12.9)	7.4 (4.6)	Perennial	Not Rated	Not Rated
Poplar Creek	Poplar Creek	1.89 (0.73)	28.3 (17.6)	28.3 (17.6)	Perennial	Moderate	Full Support

<sup>a</sup> Source: IEPA 2000b

<sup>b</sup> PS/Min I=Partial Support/Minor Impairment

There are 16 basins within the Des Plaines River Watershed. Table 2-20 summarizes the physical characteristics and biological rating of the basins.

Comparison of the water quality data for heavy metal and chlorides that are obtained from two stations (G07 and G08) on the Des Plaines River (1994 through 1998) to the General Use Water Quality Standards indicates that there have been no water quality violations (IEPA 1999). According to the IEPA General Water Use

Quality Standards, stream impairment is due to municipal point sources, habitat alterations, salinity, storm sewers, urban runoff, and nutrient loadings. The stream uses range from full support to partial support. The following streams appear on the IEPA's Section 303(d) list of water quality impaired waterbodies: Salt Creek, Des Plaines River, and the North Branch Chicago River. The water quality impairment is primarily attributed to nutrients, siltation, and organic enrichment (USEPA 1999).

**TABLE 2-20**  
Des Plaines River Watershed Basins

Drainage Basin	Streams within Basin	Drainage Area, km <sup>2</sup> (mi <sup>2</sup> )	Total Stream, km (mi)	Stream, km (mi)	Flow Characteristics	BSC Aquatic Resource Class	IEPA Use Assessment <sup>a</sup>
North Mill Creek	North Mill Creek Hastings Creek	55.9 (21.6)	28.2 (17.5) NA	20.3 (12.6) NA	Perennial	Limited	Not Rated PS <sup>b</sup>
Upper Des Plaines R.	Upper Des Plaines R.	137 (53.0)	176.0 (109.0)	36.0 (22.4)	Perennial	Highly Valued to Limited	PS <sup>b</sup>
Newport Drainage Ditch	Newport Drainage Ditch	21.8 (8.4)	NA	NA	Intermittent and Perennial	Not Rated	Not Rated
Mill Creek	Mill Creek Avon-Fremont Ditch	79.8 (30.8)	18.7 (11.6) 8.2 (5.1)	18.7 (11.6) 8.2 (5.1)	Perennial Perennial	Moderate	Full Support Not Rated
Bull Creek	Bull Creek	31.9 (12.3)	11.9 (7.4)	11.9 (7.4)	Perennial	Limited	Full Support
Indian Creek	Indian Creek	97.4 (37.6)	22.5 (14.0)	22.5 (14.0)	Perennial	Moderate	PS <sup>b</sup>
Lower Des Plaines R.	Lower Des Plaines R.	59.3 (22.9)	176 (109.0)	25.4 (15.8)	Perennial	Limited	PS <sup>b</sup>
Buffalo Creek	Buffalo Creek	55.9 (21.6)	17.5 (10.9)	17.5 (10.9)	Perennial	Not Rated	PS <sup>b</sup>
Aptakisic Creek	Aptakisic Creek	17.1 (6.6)	5.1 (3.2)	5.1 (3.2)	Perennial	Not Rated	Not Rated
Salt Creek	Salt Creek	11.4 (4.4)	73.9 (45.9)	1.8 (1.1)	Perennial	Moderate	PS <sup>b</sup>
Arlington Heights Br. Salt Creek	Arlington Heights Br. Salt Creek	21.5 (8.3)	9.7 (6.0)	3.5 (2.2)	Perennial	Not Rated	Not Rated
McDonald Creek	McDonald Creek	11.9 (4.6)	14.3 (8.9)	7.4 (4.6)	Intermittent	Limited	Not Rated
Wheeling Drainage Ditch	Wheeling Drainage Ditch	15.3 (5.9)	5.5 (3.4)	5.5 (3.4)	Perennial	Not Rated	Not Rated
West Fork	West Fork North Branch Chicago River	23.3 (9.0)	28.5 (17.7)	13.7 (8.5)	Perennial	Limited	Non-Support
Middle Fork	Middle Fork North Branch Chicago River	50.5 (19.5)	125.0 (77.7)	21.7 (13.5)	Perennial	Limited	PS <sup>b</sup>
Skokie River	Skokie River	56.2 (21.7)	38.5 (23.9)	27.2 (16.9)	Perennial	Limited	PS <sup>b</sup>

<sup>a</sup> Source: IEPA 2000b

<sup>b</sup> PS=Partial Support

The Des Plaines River, Mill Creek, Bull Creek, and an unnamed tributary (located north of Libertyville) have been classified as Class I streams by IDOT and IDNR (IDOT/IDNR 1995). The Des Plaines River is a candidate for the national Wild and Scenic Rivers list for the segments from Wheeling to Libertyville and from Libertyville to near the Wisconsin state line.

The state threatened Iowa darter occurs in two unnamed tributaries of the Des Plaines River in east-central Lake County. Seven state threatened and state endangered mussel species are known from the Des Plaines River system; however, all are outside Lake County.

The Chicago River Watershed is included in the Des Plaines River basin and is comprised of three basins: the West Fork North Branch Chicago River (West Fork), Middle Fork North Branch Chicago River (Middle Fork), and the Skokie River. These rivers generally flow through developed areas and flow into the Chicago Sanitary and Ship Canal.

Water quality data was obtained for one station on the Middle Fork for the period of 1994 to 1998. Comparison of the data to the General Use Water Quality Standards indicated that the total chloride levels exceeded the water quality standard

(500 mg/L) in 1994 and 1997. The remaining parameters obtained were within the standards.

The West Fork, Middle Fork, and Skokie River are classified as either partial support or non-support use. They are not classified as Class I streams, nor as candidates for the list of National Wild and Scenic Rivers. There have been no records of populations of threatened or endangered fish or mussels in these streams. The IEPA assessment of these streams indicated that stream impairment was attributed to nutrients, habitat alterations, chlorine, siltation, organic enrichment, pathogens, flow, and salinity.

**Lake Michigan Watershed.** The Lake Michigan Watershed consists of several waterways along the shoreline with outlets into Lake Michigan. The USGS river mileage survey lists seven streams in Lake County. The shoreline in Lake County is about 39 km (24 mi) long with the watershed ranging from 1.6 to 6.4 km (1 to 4 mi) wide. The drainage area in the study area for the Lake Michigan Watershed is 137 km<sup>2</sup> (53 mi<sup>2</sup>).

The Lake Michigan Watershed consists of five subbasins, each of which has outlets to Lake Michigan. Table 2-21 presents the drainage areas and flow characteristics of the basins.

**TABLE 2-21**  
Lake Michigan Watershed Basins

Drainage Basin	Streams within Basin	Drainage Area, km <sup>2</sup> (mi <sup>2</sup> )	Total Stream, km (mi)	Stream, km (mi)	Flow Characteristics	BSC Aquatic Resource Class	IEPA Use Assessment <sup>a</sup>
Kellogg Creek	Kellogg Creek	22.74 (8.78)	7.39 (4.59)	7.39 (4.59)	Perennial	Not Rated	Not Rated
Dead River	Dead River	47.92 (18.5)	15.85 (9.85)	15.85 (9.85)	Perennial	Not Rated	Not Rated
	Bull Creek		8.72 (5.45)	8.72 (5.45)	Perennial	Not Rated	Not Rated
Waukegan River	Waukegan River	30.46 (11.76)	11.93 (7.41)	11.93 (7.41)	Intermittent and Perennial	Not Rated	PS <sup>b</sup>
Pettibone Creek	Pettibone Creek	10.77 (4.16)	4.41 (2.74)	4.41 (2.74)	Perennial	Not Rated	PS <sup>b</sup>
Bluff/Ravine	12 Unnamed Streams	25.41 (9.81)	Varies	Varies	Perennial	Not Rated	Not Rated

<sup>a</sup> Source: IEPA 2000b

<sup>b</sup> PS= Partial Support

There is no water quality data readily available for any of the streams in the Lake Michigan Watershed to compare to the General Use Water Quality Standards. None of the streams appear on either the Class I stream list or the National Wild and Scenic Rivers candidate list. The Waukegan River is included on the IEPA's Section 303(d) list of water quality impaired streams. Priority organics and metals are the primary cause of the water quality impairment.

### 2.3.3 Wetlands

Wetlands are associated with lakes, streams, and their associated floodplains as well as isolated depressions. Within the study area, the relief is generally gently sloping, with poorly defined drainage patterns. Many of the drainageways end in depressions and marshes. The *1987 Corps of Engineers Wetland Delineation Manual* (hereafter, *The Manual*) defines a wetland as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." In Illinois, the definition of wetlands as defined by the Interagency Wetland Policy Act (IWPA), is similar to the federal definition, with the exception that it specifically states that there needs to be a predominance of hydric soils present. All wetlands meeting these three criteria would be considered jurisdictional areas under state law for all projects using state or state pass-through funding. The IWPA definition includes restored or created wetlands for mitigation that do not currently meet the parameters stated.

For the purposes of complying with the Section 404 program, the federal government endorses the use of two separate delineation manuals, the *1987 Corps of Engineers Wetlands Delineation Manual* and the Department of Agriculture's *National Food Security Act Manual* (third edition). A 1994 *Federal Memorandum of Agreement* between the Department of Defense, the Department of Interior, the USEPA, and the Department of

Agriculture defines situations to which these two manuals may be applied. It requires the use of the *1987 Corps of Engineers Wetland Delineation Manual* (with current US Army Corps of Engineers' regulatory guidance) by all federal resource agencies on non-agricultural land for Section 404 purposes. When determinations or delineations are made on agricultural lands for Section 404 purposes, the *National Food Security Act Manual* must be used.

The Lake County Wetland Inventory (LCWI), including the Advanced Identified Wetlands (ADID) program and the National Wetland Inventory (NWI), provide information for summarizing the wetlands in Lake County and was the primary source of wetland data for this study. Natural Resource Conversation Service (NRCS) Wetland Maps were not used for this study. After a preferred alternative is selected, the NRCS maps will be used during the formal delineation process.

The LCWI database is locally derived and is considered more locally accurate than the NWI. The LCWI classifies wetlands in Lake County under seven categories: artificial wetlands, converted wetlands, two categories of farmed wetlands, prior converted, urban converted, and wetlands. The LCWI defines the 'wetlands' category as being those areas that are relatively undisturbed as a result of agriculture or development and includes wetlands identified as ADID.

Wetland resources in Lake County were assessed on a watershed level due to the size of the study area. The three primary watersheds in Lake County are the Fox River, Des Plaines River including the North Branch of the Chicago River, and Lake Michigan. The Fox River and Des Plaines River watersheds account for approximately 95 percent of the LCWI identified wetland acreage in Lake County. Much of this total is part of the Chain O' Lakes (see Figure 2-13). Table 2-22 (on the following page) illustrates Lake County wetland types and acreage by watershed. Areas categorized by LCWI as 'wetlands' constitute 97, 94, and 94 percent, respectively, of all the LCWI wetlands in the

Fox River, Des Plaines River, and Lake Michigan watersheds. The other six types of wetlands account for a small percentage of total wetlands mapped by the LCWI in the county.

The total wetland acreage for Lake County mapped by the LCWI as shown in Table 2-22 includes large expanses of open water, including the Chain O' Lakes. By definition, some of these open water bodies would be defined as open water habitat and others as riverine rather than as wetlands. To better assess wetland resources in the county that meet the criteria for wetlands, as defined by *The Manual* and the IWPA, it was necessary to remove the areas that are considered open water such as lakes and rivers from these totals. Open water lakes, ponds, and rivers are "waters of the U.S." and, as such, are still regulated by the US Army Corps of Engineers. Mitigation of impacts to the "water" is assessed in a case-by-case basis. In addition, for this assessment, the totals for the six LCWI categories; artificial wetlands, converted wetlands, both farmed wetlands, prior converted and urban converted were removed from the total. Total wetland resources as mapped by

LCWI are approximately 18,500 ha (45,700 ac), not including open water. Much of the open water area removed from this total is associated with the Chain O' Lakes. The NWI indicates that there are approximately 13,390 ha (33,087 ac) of wetlands in Lake County (Suloway and Hubbell 1994). The LCTIP has resolved to use the LCWI data for the remainder of this study. The rationale for this decision is related to the greater care and accuracy of the LCWI information.

There are 203 ADID wetlands in Lake County, totaling about 10,000 ha (25,000 ac). The ADID wetland program is a USEPA initiative developed to shorten permit processing time. Also, it provides some predictability to the Section 404 regulatory program, by providing information to assist local governments in zoning, permitting, and land acquisition decisions. This was a cooperative effort with the USEPA, US Army Corps of Engineers, USFWS, IDNR, NIPC, and various departments and agencies within Lake County. The Lake County ADID inventory was adopted on January 20, 1993 (NIPC 1992). The ADID wetlands were considered

**TABLE 2-22**  
Lake County Wetland Inventory

Wetland Type	Fox River Watershed, ha (ac) <sup>a</sup>	Des Plaines River Watershed, ha (ac)	Lake Michigan Watershed, ha (ac)
Artificial Wetlands	40 (99)	43 (106)	9 (22)
Converted Wetlands	40 (99)	9 (22)	—
Farmed Wetlands	163 (403)	179 (442)	6 (15)
Farmed Wetlands <sup>b</sup>	40 (99)	94 (232)	2 (5)
Prior Converted	15 (37)	9 (22)	—
Urban Converted	81 (200)	283 (699)	121 (299)
Wetlands	11,940 (29,504)	9,996 (24,701)	2,347 (5,800)
<b>Total</b>	<b>12,319 (30,441)</b>	<b>10,613 (26,224)</b>	<b>2,485 (6,141)</b>
Non Wetland <sup>c</sup>	970 (2,397)	526 (1,300)	40 (99)

<sup>a</sup> Rounded to the nearest whole number

<sup>b</sup> Similar to farmed wetlands except that they do not qualify for regulation under Swampbuster because not enough crop damage from flooding and inundation occurs.

<sup>c</sup> Areas that were considered non-jurisdictional wetlands by LCWI yet were mapped as wetlands in the NWI. Source: Lake County Wetland Inventory (LCWI) 1990

unsuitable for the discharge of dredge or fill material. As a result, the US Army Corps of Engineers has exerted discretionary authority over these wetlands, and any proposed impacts to these wetlands are not eligible for nationwide permitting.

Both the LCWI and the NWI use wetland assessment methodologies largely based on remote sensing methods. Such methods are useful for rough assessment over large areas; however, field-based assessments are always more accurate on an individual wetland site level. Because of limited information on individual wetlands at a countywide level of assessment, the only available qualitative assessment conducted on wetlands at this scale is the ADID study. The ADID study included a general assessment of quality and functions of the wetland resources in Lake County. Wetlands identified as ADID generally embrace three qualities: habitat diversity, stormwater storage, and water quality mitigation. The Lake County ADID inventory characterized the qualities of each ADID wetland, and the LCTIP further assessed the ADID study and identified the highest quality wetlands, which are shown in Figure 2-14. Following the selection of the preferred alternative, impacted ADID wetlands would be verified with a field-based, multi-functional wetland assessment.

Because a qualitative assessment of wetland resources in Lake County is limited to the ADID program, only a general assessment of important wetland resources in the county was performed. Of the 203 wetlands classified as ADID wetlands, more than 130 were considered to have high functional values for wildlife habitat and high quality plant communities. Additionally, ADID wetlands have also been identified as habitats for threatened and endangered species of plants and wildlife. Based on original determinations, over 60 ADID wetlands were identified as having threatened or endangered species present.

A review of the ADID locations in Lake County show that a majority of these sites are located along streams, lakes or within protected

lands such as forest preserves, nature preserves, and Illinois Natural Area Inventory (INAI) sites. Figure 2-15 shows the relationship of ADID wetlands and these protected sites. This figure also shows general concentrations of these ADID wetlands. The two largest complexes are within Illinois Beach State Park near Zion and the Chain O' Lakes State Park in the northwestern part of the county. Other smaller concentrations of ADID wetlands can be identified; these areas are broken out by watershed.

Additionally, several non-ADID wetlands located throughout the county may be afforded the same protection as a high quality wetland. These sites may have been smaller than the 2 ha (5 ac) area limitation for inclusion as potential ADID. Additionally, some of these wetlands are afforded higher protection based on their proximity to forest preserves, nature preserves, INAI sites, or other public lands. Approximately 682 wetlands, totaling approximately 1,783 ha (4,406 ac) of non-ADID wetlands, are located within designated lands and could be considered higher quality wetlands. These wetlands are summarized in the watershed discussions.

### 2.3.3.1 Fox River Watershed

The LCWI reports over 12,200 ha (30,000 ac) of all wetland types are within the Lake County portion of this watershed (Table 2-23, on the following page). According to the GIS database, 107 ADID wetlands (48 percent) are in the Fox River Watershed in Lake County. Total ADID acreage in the Fox River Watershed in Lake County is 5,550 ha (13,714 ac), or roughly 44 percent of the LCWI wetland acreage in the watershed (Figure 2-13).

There are six large ADID wetland complexes within this watershed. The largest ADID complexes are the Chain O' Lakes State Park, which includes the Grass Lake Wetland Complex, north, east, and west of Grass Lake; along Squaw Creek, south of Long Lake near the Village of Round Lake; along the Tower Lake Drain from Tower Lake to the Fox River and Grassy Lake, near North Barrington; the Loon Lake complex, extending to Deer Lake

into the Des Plaines River Watershed; Volo Bog area south of the Chain O' Lakes; and the Wauconda area, extending southwest towards the Tower Lakes complex. As Figure 2-15 shows, most of these ADID wetland complexes are associated with forest preserves, nature preserves, INAI sites, and state parks. In general, the relationship between these wetland complexes and the protected sites indicates that these wetlands are relatively high quality.

Within this watershed, there are approximately 174 non-ADID wetlands totaling 292 ha (723 ac) located within protected areas. Many of these are located in three forest preserve sites: Cuba Marsh, Lakewood, and the northern half of Grant Woods.

### 2.3.3.2 Des Plaines River Watershed

The LCWI reports over 11,400 ha (27,000 ac) of all wetland types are within the Lake County portion of the Des Plaines River Watershed (Table 2-24, on the following page). According to the GIS database, 102 ADID wetlands

(45 percent) are in the Des Plaines River Watershed in Lake County. Total ADID acreage in the Des Plaines River Watershed in Lake County is 2,553 ha (6,311 ac), or approximately 24 percent of the LCWI wetland acreage in the watershed (Figure 2-13).

There are seven large ADID wetland complexes within this watershed. The largest ADID complexes in this watershed are Loon Lake/Deer Lake complex that extends into the Fox River Watershed; the Fourth Lake Fen/Rollins Savanna complex; the Des Plaines River Trails/Wadsworth Prairie complex near Wadsworth; the Middle Fork Savanna complex near Lake Forest; Site 15 Forest Preserve complex, along the Middle Fork of the North Branch of the Chicago River near Green Oaks; Grainger Woods Forest Preserve complex near Vernon Hills; and Ryerson Woods complex near Riverwoods. Figure 2-15 shows that most of these ADID wetland complexes are associated with forest preserve, nature preserves, and INAI sites. In general, the relationship between these wetland

TABLE 2-23

LCWI Subbasin Wetland Totals—Fox River Watershed, Lake County

Drainage Basin	Streams within Basin	Total Wetland, ha (ac) <sup>a</sup>	% of County Wetlands	ADID Wetlands	ADID, ha (ac) <sup>a</sup>
Upper Fox River	Fox River	4,700 (11,614)	20	15	2,100 (5,189)
Sequoit Creek	Sequoit Creek	1,200 (2,965)	4	14	890 (2,199)
Fish Lake Drain	Fish Lake Drain	560 (1,384)	2	9	240 (593)
Squaw Creek	Squaw Creek; Seavey Ditch; Eagle Creek	1,900 (4,695)	7	27	600 (1,483)
Lower Fox River	Fox River	230 (568)	0.9	6	120 (297)
Mutton Creek	Mutton Creek; Cotton Creek	560 (1,384)	2	8	240 (593)
Slocum Lake Drain	Slocum Lake Drain	800 (1,977)	3	7	360 (890)
Tower Lake Drain	Tower Lake Drain	840 (2,076)	3	5	600 (1,483)
Flint Creek	Flint Creek	1,450 (3,583)	5	14	320 (791)
Nippersink		NA	NA	2	80 (198)
<b>TOTAL</b>		<b>12,240 (30,246)</b>	<b>46.9</b>	<b>107<sup>b</sup></b>	<b>5,550 (13,716)</b>

<sup>a</sup> Rounded to nearest whole number

<sup>b</sup> Some ADID wetlands overlap watershed boundaries inflating the total number of ADID wetlands

Source: CH2M HILL, GIS Database 1999

complexes and the protected sites indicates that these wetlands are of relatively high quality. All but nine of the Lake County Forest Preserve sites in this watershed contain ADID wetland complexes. About eight ADID wetlands are located in nature preserves or INAI sites in this watershed.

In addition, the ADID designation has been applied to segments of stream systems in this watershed that would include adjacent wetlands. These streams include Mill Creek, Bull Creek, Indian Creek, and Buffalo Creek.

Within this watershed, there are approximately 456 non-ADID wetlands totaling 1,360 ha (3,361 ac), located within protected areas. Many of these wetlands are located in eight forest preserve sites; four sites are located along the Des Plaines River and include

Wright Woods/Half Day, Gurnee Woods, Wetlands Project, and Van Patten Woods. Two of the forest preserve sites are along the North Branch of the Chicago River: Prairie Wolf Slough and Middle Fork Savanna. The remaining two sites include the Waukegan Savanna and the Rollins Savanna.

### 2.3.3.3 Lake Michigan Watershed

The LCWI reports over 3,100 ha (7,660 ac) of all wetland types are within the Lake Michigan Watershed (Table 2-25, on the following page). According to the GIS database, 14 ADID wetlands (6 percent) are in the Lake Michigan Watershed in Lake County. Total ADID acreage in this watershed in Lake County is 1,770 ha (4,374 ac), or roughly 57 percent of the LCWI wetland acreage in the watershed (Figure 2-13).

TABLE 2-24

LCWI Subbasin Wetland Totals—Des Plaines River Watershed, Lake County

Drainage Basin	Streams within Basin	Total Wetland, ha (ac) <sup>a</sup>	% of County Wetlands	ADID Wetlands	ADID, ha (ac)
North Mill Creek	North Mill Creek; Hastings Creek	1,000 (2,471)	4	12	490 (1,211)
Mill Creek	Mill Creek Avon-Fremont Ditch	1,500 (3,707)	6	15	570 (1,409)
Newport Drainage Ditch	Newport Drainage Ditch	240 (593)	1	3	40 (99)
Upper Des Plaines River	Upper Des Plaines River	2,900 (7,166)	10	15	360 (890)
Bull Creek	Bull Creek	450 (1,112)	2	6	120 (297)
Indian Creek	Indian Creek	1,300 (3,212)	5	13	360 (297)
Lower Des Plaines River	Lower Des Plaines River	1,100 (2,718)	4	12	200 (494)
Buffalo Creek and 66	Buffalo Creek	500 (1,236)	2	3	80 (198)
Aptakisic Creek	Aptakisic Creek	200 (494)	0.7	0	0 (0)
Skokie River	Skokie River	650 (1,606)	2	4	120 (297)
Middle Fork	Middle Fork North Branch Chicago River	1,100 (2,718)	4	16	200 (494)
West Fork	West Fork North Branch Chicago River	200 (494)	0.8	3	13 (32)
<b>TOTAL</b>		<b>11,140 (27,527)</b>	<b>41.5</b>	<b>102<sup>b</sup></b>	<b>2,553 (6,311)</b>

<sup>a</sup> Rounded to nearest whole number

<sup>b</sup> Some ADID wetlands overlap watershed boundaries inflating the total number of ADID wetlands

Source: CH2M HILL GIS Database 1999

There is only one large ADID wetland complex within this watershed. The Illinois Beach State Park/Spring Bluff Forest Preserve are identified as ADID sites. This ADID complex extends from the Wisconsin state line to Waukegan Harbor, with minimal interruptions for areas like the Zion Nuclear Power Plant. The ADID wetlands extend south past the boundaries of the state park and coincide with the boundaries of designated INAI sites. Only two other ADID wetlands are located in this watershed. Figure 2-15 illustrates the location of ADID wetlands in the study area and the Lake Michigan Watershed.

Within this watershed, there are approximately 50 non-ADID wetlands totaling 130 ha (322 ac) located within protected areas. Many of these wetlands are located in three forest preserve sites: Spring Bluff along Lake Michigan, Lyons Woods, and Greenbelt.

### 2.3.4 Floodplains

About 21,185 ha (52,350 ac) in Lake County are designated as floodplains, representing 17.4 percent of the land area (LCTIP 1999). Floodplains are defined as those flood prone areas that have been identified as part of the National Flood Insurance Study Program (NFIP) and are depicted on the Federal Emergency Management Agency (FEMA) maps. The floodplain areas, watershed boundaries, and major waterways within the

Fox River, Des Plaines River, and Lake Michigan watersheds are shown in Figure 2-12. FEMA has established the 1-percent annual chance (or 100-year) flood as the national standard for floodplain management purposes. The FEMA maps depict floodplains for waterways with tributary areas of at least 2.6 km<sup>2</sup> (1 mi<sup>2</sup>), or 260 ha (640 ac).

In addition to the floodplain boundaries, some waterways have identified floodways. The floodway is that portion of the floodplain that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Regulatory floodways are located in 42 municipalities as well as unincorporated areas of Lake County (FEMA 1994). The relationship between the floodway, floodway fringe, and floodplain is graphically depicted on the waterway cross section in Figure 2-16.

The Lake County Stormwater Management Commission (SMC) regulates development in additional floodplains based on the requirements of the Lake County Watershed Development Ordinance (WDO). Per the WDO criteria, floodplains include any flood prone area with a tributary area of at least 40 ha (100 ac) (rather than 260 ha or 640 ac) and any area of ground depression capable of storing 0.75 ac-ft of water during the 100-year flood event.

The function and role of floodplains are described in the Model Floodplain Ordinance developed by NIPC and the IDNR-Office of

TABLE 2-25  
LCWI Subbasin Wetland Totals—Lake Michigan Watershed, Lake County

Drainage Basin	Streams within Basin	Total Wetland <sup>a</sup>	% of County Wetlands	ADID Wetlands	ADID
Kellogg Creek	Kellogg Creek	650 (1,606)	2	3	500 (1,236)
Dead River	Dead River, Bull Creek	1,600 (3,954)	6	4	1,250 (3,089)
Waukegan River	Waukegan River	650 (1,606)	2	3	12 (30)
Pettibone Creek	Pettibone Creek	40 (99)	0.2	0	0 (0)
Bluff/ Ravine	12 unnamed streams	160 (395)	0.6	4	8 (20)
<b>TOTAL</b>		<b>3,100 (7,660)</b>	<b>10.8</b>	<b>14<sup>b</sup></b>	<b>1,770 (4,375)</b>

<sup>a</sup> Rounded to nearest whole number

<sup>b</sup> Some ADID wetlands overlap watershed boundaries inflating the total number of ADID wetlands

Source: CH2M HILL, GIS Database 1999

Water Resources. The ordinance states that:

“Floodplains and their associated stream, wetland, and shoreline areas are among the State’s greatest assets, because of multiple benefits related to environmental quality, natural resource management, and recreational opportunity. Floodplains are generally best able to provide these benefits if kept in a natural condition. Alterations of floodplains have resulted in increased flood and storm water hazards, reduced water quality, loss of habitat and recreational opportunities and poor aesthetics within communities. Wherever possible, the natural characteristics of floodplains and their associated water bodies should be preserved.”

The western-most part of the county drains to the Fox River. The Fox River Watershed comprises 43,055 ha (106,390 ac), or 35 percent of Lake County. The far eastern portion drains to Lake Michigan. The Lake Michigan Watershed comprises 13,731 ha (33,930 ac), or 11 percent of Lake County. Between these two watersheds are the Des Plaines River and Chicago River watersheds, which remain separate within Lake County, but join together downstream in Cook County; they are included together as part of the Des Plaines River Watershed for purposes of this analysis. This combined Des Plaines River Watershed comprises 65,070 ha (160,790 ac), or 54 percent of the total area of Lake County (LCTIP 1999).

There are 47 tributaries in the Fox River Watershed, most having associated floodplains. The Chain O’ Lakes is an essential natural feature covering much of the land area. Older homes line the shores of numerous lakes. However, direct development in the floodplain is now infrequent, occurring mostly in isolated areas within the unincorporated areas. Of the 43,055 ha (106,390 ac) in this watershed, 11,210 ha (27,700 ac), or 26 percent of the area, are within floodplains. This is, by far, the highest concentration of floodplains within the county, and is primarily attributed to the Chain O’ Lakes. Land uses within this watershed

include agriculture (22.5 percent), vacant and open space (28.1 percent), and water (10.8 percent). The remaining land area is currently developed (39.6 percent). Of the 11,210 ha (27,700 ac) of floodplain area, 14.8 percent is currently developed (LCTIP 1999).

The Des Plaines River Watershed has 44 tributaries, most having associated floodplains. Over 40 percent of the Des Plaines River floodplain has been set aside as forest preserve and is protected from development. Of the 65,070 ha (160,790 ac) in this watershed, 8,470 ha (20,930 ac), or 13.0 percent of the area, are within floodplains. Land uses within this watershed include agriculture (21.5 percent), vacant and open space (25.9 percent), and water (2.9 percent). The remaining land area is developed (49.7 percent). Of the 8,470 ha (20,930 ac) of floodplain area, 22.1 percent is developed (LCTIP 1999).

The Lake Michigan Watershed has 12 tributaries. Of the 13,731 ha (33,930 ac) in this watershed, 1,505 ha (3,720 ac), or 11.0 percent of the area, are within floodplains. Land uses within this watershed include agriculture (4.4 percent), vacant and open space (24.8 percent), and water (1.1 percent). The remaining land area is currently developed (69.7 percent). This is, by far, the most developed section of Lake County. Of the 1,505 ha (3,720 ac) of floodplain area, 19.9 percent is currently developed (LCTIP 1999).

## 2.3.5 Biological Resources

The Illinois Natural Heritage Database, the federal lists for threatened and endangered species, and IDNR land cover type mapping were reviewed regarding biological resources within the study area. The review of biological resources was based solely on documentary and records research; it involved no fieldwork.

### 2.3.5.1 Vegetation and Cover Types

IDNR categorizes 14 vegetative cover types in Lake County. Table 2-26 (on the following page) summarizes the total acreage and

percent of the total acres in Lake County for each cover type. A database compiled by INHS indicates that there are over 1,440 species of plants recorded for Lake County (Iverson 1999).

Approximately 42 percent of the total cover in Lake County is considered developed land, including low, medium, and high-density development, along with urban grasslands. Both high and medium density developments contain a large amount of impervious area, which provides limited cover, foraging, and resting areas for wildlife. Only small amounts of impervious areas are present for low-density designations, which provide greater amounts of foraging and cover habitat. Low-density areas are generally considered to be covered by grassland, shrubland, and woodlands. Other dominant cover types include closed canopy deciduous forest (14 percent), row crops (13 percent), and rural grassland (12 percent). Grasslands are divided

into two groups: urban and rural. Urban grassland includes parks, residential lawns, golf courses, cemeteries, and other open space, both private and public. Rural grassland is defined as pastureland, grassland adjacent to waterways, vegetated buffer strips, and Conservation Reserve Program (CRP) land. The CRP is a federal program that removes farmland from active agricultural production.

The most important cover types for wildlife are the forested lands (20 percent), rural grasslands (12 percent), and wetlands (11 percent), which include deep marsh, shallow marsh, shallow water wetlands, and forested wetlands.

Based on the IDNR classification, 11 percent of the county is comprised of open water and wetland communities. This combination of cover types provides important habitat for many species of plants and wildlife, and it harbors many of the threatened or endangered species of birds in the county. Section 2.3.3, *Wetlands*, illustrates the

**TABLE 2-26**  
Cover Types, Lake County

Cover Types	ha (ac) in Lake County	% in Lake County
High Density Development	5,402 (13,348)	4.5
Medium Density Development	13,176 (32,558)	10.9
Low Density Development	11,032 (27,261)	9.1
Rural Grassland	14,025 (34,657)	11.6
Urban Grassland	20,593 (50,887)	17.0
Row Crop	15,902 (39,294)	13.1
Deciduous Forest–Open Canopy	6,961 (17,200)	5.7
Deciduous Forest–Closed Canopy	17,161 (42,406)	14.2
Orchards and Nurseries	448 (1,108)	0.4
Open Water	3,457 (8,542)	2.9
Deep Marsh	3,671 (9,070)	3.0
Shallow Marsh	3,643 (9,001)	3.0
Shallow Water Wetlands	3,920 (8,945)	3.0
Forested Wetlands	2,114 (5,224)	1.7
<b>TOTAL</b>	<b>121,505 (299,501)</b>	<b>100</b>

Source: Lumen 1996

general distribution of wetland habitats across the county by watershed.

There are few remaining areas of native tallgrass prairie and oak savannas within Lake County. The larger remnant prairie and savanna communities are generally protected and are found within the forest preserve district holdings. A review of the nature preserves list for Lake County shows seven large prairie communities in Lake County. These include:

- Gavin Bog and Prairie
- Highmoor Park Nature Preserve
- Hibernia Nature Preserve
- Illinois Beach State Park (Nature Preserve)
- Lyons Prairie and Marsh Nature Preserve
- Skokie River Nature Preserve
- Wadsworth Prairie Nature Preserve

All the sites listed are protected as either forest preserve or Nature Preserve sites. Additional known prairie sites, not listed above, are the Buffalo Grove Prairie located on private land north of Lake Cook Road near the Wisconsin Central Railroad tracks and the North Shore Prairie located along Sheridan Road in Lake Bluff. The Buffalo Grove Prairie is owned by a utility company, thus no special protected status has been secured for this particular site. The North Shore Prairie is being managed by the Lake Forest Open Lands Association (Taft 1997c). Section 2.3.6, *Special Lands*, details the types of plant communities found within the individual forest preserves including prairie and savanna communities. Most remaining stands of native prairie are not located within forest preserves. Other areas may contain scattered remnants of individual plant species or small groupings of prairie plants. These are mostly scattered, small in size, and generally occur within protected rights-of-way, including utility or railroad corridors. As prairies and savannas have no special protection status, unless they coincide with wetlands or nature preserves, they have historically been developed for agricultural or urban development purposes.

Forest resources within the study area are scattered throughout the entire county. Large contiguous stands of woods are generally located

along the existing waterways primarily along the Des Plaines River. Historically, forests and woods were confined to the areas along the major rivers due to the existence of the native prairie communities that once dominated Lake County. The conversion of prairies to agricultural lands prevented the expansion of forested areas throughout the county. Original climax forest in Lake County is believed to be oak-hickory.

Other unique forested communities include the dry mesic to mesic forest seep communities located in the ravines adjacent to Lake Michigan, primarily in the Lake Forest area north of Fort Sheridan. These areas have been identified as post-Pleistocene glaciation refuges for remnant plant communities (Taft 1997a, 1997c).

The remaining large tracts of forest resources in the study area are generally found along the smaller waterways, including Buffalo Creek, Indian Creek, Bull Creek, Mill Creek, and in the southwest corner of Lake County between Lake Zurich, Tower Lakes, and Barrington. A review of aerial photography shows that many of the forested areas identified by IDNR are residential developments that retained large amounts of forested areas within the development.

Other forested areas in Lake County would generally be considered urban or suburban forests, which include trees planted within cities and villages, along with residences that are built in heavily wooded areas.

The least productive cover types for providing habitat for wildlife would include orchards and nurseries, row crops, and high and medium density developments. Wildlife may use these areas to some extent for foraging, but there is little opportunity for nesting or cover for most species. Wildlife species and vegetation communities in these areas are limited to those that are highly tolerant to disturbance.

#### 2.3.5.2 Wildlife

The study area contains a variety of wildlife habitats. The most important cover types for wildlife are the forested lands, rural grasslands, and wetlands. The ongoing development within the county has somewhat limited the distribution of wildlife to these

three cover types. Many of these areas are found within stream and river corridors, forest preserve district holdings, and the more rural areas in the western half of the county. Large forest preserve holdings, such as Independence Grove, MacArthur Woods, Ryerson Woods, and Lakewood, provide large areas of habitat within the central portion of the county. Of these four large preserves, all but Lakewood are located within the Des Plaines River “greenway” that extends north–south, almost the entire length of the county. Lakewood, located near Wauconda, is relatively isolated. Additional large areas of wildlife habitat are found within two state parks located within Lake County. These include Chain O’ Lakes State Park and Illinois Beach State Park along Lake Michigan.

With the exception of the Des Plaines River corridor and the Chain O’ Lakes region, most of the areas of prime wildlife habitat are scattered throughout the county. The lack of protected corridors linking these habitat areas creates a wildlife island effect. While this island effect is not as important for birds and large mammal species, this can inhibit movement of other forms of wildlife throughout the county. The lack of protected corridors also increases the potential for human/wildlife interaction such as collisions with vehicles and wildlife damage to residential landscaping. Figure 2-15 illustrates the location of forest and nature preserves within the county, along with ADID wetland habitats. This figure also shows a lack of habitat continuity along an east-west direction. Without using farms, stream corridors, wetlands or developed areas, there is little opportunity for east-west wildlife movement in Lake County.

Figure 2-15 also shows the lack of continuous north-south greenway or wildlife corridors outside of the Des Plaines River corridor. Although more open lands are present in the western half of the county, wildlife migrating north–south, west of the Des Plaines River corridor, must also use limited stream corridors and wetland complexes where available, along with farmland, and developed areas for movement.

The developed areas of the county will provide minimal habitat for wildlife. The types of wildlife found within the urban/suburban areas are species that are tolerant of disturbance and human activities. This includes a variety of bird and mammal species.

**Birds.** The Lake County Forest Preserve District (LCFPD) reports that 293 bird species are known to occur in Lake County. Of this number, 125 species are known to nest in Lake County. LCFPD also indicates an additional 18 species are believed to nest in the county. A full list of all birds known to occur in Lake County is provided in Appendix C. Of the nesting species, there are ten birds of prey, seven game birds, seven herons, seven species of waterfowl, two rails, five shorebirds, two gulls, and three terns, as well as woodpeckers and songbirds. Two heron colonies or rookeries are known to be present, with the potential for more colonies to be present within the county. A heron colony was noted near Indian Creek (Amundsen and Enstrom 1996) and at Almond Marsh. Both of these areas coincide with ADID wetland designations.

All habitat and cover types may be used by birds for foraging, nesting, or breeding. Although it is not generally regarded as bird habitat, even high-density developed land is used by many songbirds, gulls, and doves for forage, rest, and breeding activities. Many of the bird species identified in Lake County are commonly found in or near open water and wetlands. In addition, many of the songbirds (passerines or perching birds), of which 76 species breed within the study area, commonly use water systems for daily feeding and resting activities. Table 2-27 (on the following page) lists the birds that are, for the most part, directly associated with open water and wetlands. In general, these species are more dependent on less disturbed areas that retain some natural features and can be used, to some extent, as indicators of habitat quality. Exceptions to this are Canadian geese and mallards, which are fully adapted to human activities and have proliferated in human presence.

**Mammals.** The LCFPD lists 42 species of mammals known to occur in Lake County. A full list of mammals known to inhabit Lake County is found in Appendix C. While these species have been noted to occur in the forest preserve holdings, the listing is indicative of the types of mammals that inhabit the county as a whole. All of the mammal species listed are terrestrial, with the exception of beaver (*Castor canadensis*) and muskrat (*Onatra zibethicus*). Mink (*Mustela visons*), which is both aquatic and terrestrial, is also known to occur. The list of species includes eight species of bats, two species of fox, five species of squirrels, and two species of weasels. Most Illinois furbearers have been reported in Lake County, along with 21 rodent species. White-tailed deer (*Odocoileus virginianus*) and coyote (*Canis latrans*) are the only large mammals known to occur in Lake County.

Species considered by LCFPD to be rare in Lake County include Pygmy shrew (*Sorex hoyi*), Franklin's ground squirrel (*Spermophilus franklinii*), prairie vole (*Microtus ochragaster*), woodland vole (*Microtus pinetorum*), and the badger (*Taxidea taxus*). The gray fox (*Urocyon cinereoargenteus*) is the only species considered uncommon. The species that are considered rare or uncommon generally prefer larger, relatively undisturbed areas for habitat. Seventeen percent of mammal species in Lake County are considered rare, with 80 percent considered abundant or common. Abundant and common species can be found in a variety of habitats and are generally tolerant of development and human activities. The forest preserve sites and the rural western portions of the county appear to provide the majority of the necessary habitat requirements for these mammal species.

TABLE 2-27

Bird Species Found In or Near Open Water and Wetlands in Lake County

Common	Scientific	Common	Scientific
Pied-billed grebe*	<i>Podilymbus podiceps</i>	Mute swan	<i>Cygnus olor</i>
American bittern*	<i>Botaurus lentiginosus</i>	Wood duck	<i>Aix sponsa</i>
Least bittern*	<i>Ixobrychus exilis</i>	Mallard	<i>Anas platyrhynchos</i>
Great blue heron	<i>Ardea herodias</i>	Blue-winged teal	<i>Anas discors</i>
Great egret	<i>Casmerodius albus egretta</i>	Hooded merganser	<i>Lophodytes cucullatus</i>
Green-backed heron	<i>Butorides virescens</i>	King rail*	<i>Rallus elegans</i>
Black-crowned night heron*	<i>Nycticorax nycticorax</i>	Virginia rail	<i>Rallus limicola</i>
Yellow-crowned night heron*	<i>Nyctanassa violacea</i>	Sora	<i>Porzana carolina</i>
Canada Goose	<i>Branta canadensis</i>	Common moorhen*	<i>Gallinula chloropus</i>
Ring-billed gull	<i>Larus delawarensis</i>	American coot	<i>Fulica americana</i>
Herring Gull	<i>Larus argentatus</i>	Sandhill crane*	<i>Grus canadensis</i>
Common tern	<i>Sterna hirundo</i>	Killdeer	<i>Charadrius vociferus</i>
Forster's tern*	<i>Sterna forsteri</i>	Spotted sandpiper	<i>Actitis macularia</i>
Black tern*	<i>Chlidonias niger</i>	Upland plover*	<i>Bartramia longicauda</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>	Common snipe	<i>Capella gallinago</i>
Woodcock	<i>Philohela minor</i>		

\* State or federal-listed threatened or endangered species

**Reptiles and Amphibians.** According to the LCFPD, 19 species of reptiles, seven of which are turtles and 12 are snakes, and 15 species of amphibians are known to occur in Lake County. The INHS indicates that up to 36 species of reptiles and amphibians (19 reptiles and 17 amphibians) could inhabit Lake County based on range maps (Phillips 1995). Species considered rare or uncommon by LCFPD in Lake County include the Spiny softshell turtle (*Trionyx spiniferus*), Eastern hognose snake (*Heterodon platirhinos*), smooth green snake (*Opreodryx vernalis*), and the red-bellied snake (*Storeria occipitonaculata*). The remaining species of reptiles are considered common or locally common.

The LCFPD lists 15 species of amphibians as occurring in Lake County. Five of the species are newts or salamanders, including the mud puppy (*Necturus maculosus*) that inhabits Lake Michigan. Two species of toads and eight species of frogs also occur. There is no information provided by the LCFPD on the abundance of any amphibian species. Water systems including wetlands, streams, rivers, and lakes are important habitats for both reptiles and amphibians. The full list of reptiles and amphibians as documented by the LCFPD is provided in Appendix C.

**Fish.** The LCFPD lists 89 species of fish as occurring in Lake County. Of these, 21 species are found only in Lake Michigan and are not within the project study area. Other fish species known in Lake County include 22 minnows and carp, four suckers, six catfish and bullheads, two true basses, 10 sunfish, and 10 perch and darter species. Additional information on fishes is provided in Section

2.3.2, *Water Quality and Water Resources*. A full list of known species within Lake County is provided in Appendix C.

### 2.3.5.3 Threatened and Endangered Species

**Federal-listed Species.** According to information provided by the USFWS and the USFWS North Central Region “Red Book,” there are only two federal-listed plant species, the Eastern prairie fringed orchid/prairie white-fringed orchid (*Platanthera leucophaea*) and Pitcher’s thistle/dune thistle (*Cirsium pitcheri*), occurring in Lake County. Two federal-listed bird species, the piping plover (*Charadrius melodus*) and the interior least tern (*Sterna antillarum*), are listed as occurring in Lake County. Both plant species are federal threatened, whereas both bird species are federal endangered. The Karner blue butterfly, (*Lycaeides melissa samuelis*—federal and state endangered) is also known to occur within the county. The USFWS indicates that the Karner Blue butterfly may be extirpated from the county. Lake County is not known to harbor any identified federal-listed mammals, reptiles, or amphibians. No federal threatened or endangered fish are known to occur within Lake County. Table 2-28 lists the number of known federal-listed threatened and endangered species by taxa. Appendix C lists all federal threatened and endangered species and their associated habitat.

**State-listed Species.** The list of Illinois threatened and endangered species was reviewed to determine the amount of listed species known to occur within Lake County. Table 2-28 lists the known state-listed threatened and endangered species by taxa. Appendix C lists the state threatened or

TABLE 2-28

Number of Known, Federal and State-listed Threatened and Endangered Species by Taxa in Lake County \*

	Plants	Insects	Fish	Amphibians	Reptiles	Birds	Mammals	Mollusks
Number of Federal-listed T&E Species	2	1	0	0	0	2	0	0
Number of State-listed T&E Species	127	4	9	1	4	26	0	1

\* Number of known breeding species  
Source: Herkert 1994, 1999

endangered species known to occur in Lake County.

- **Plants**—There are 127 state threatened and endangered plant species known to occur within Lake County. Twenty-six of the plant species are state threatened and 101 are considered state endangered. Of the state-listed plant species, 33 are generally found along the Lake Michigan shoreline or similar sandy habitats. Approximately 43 listed species are generally found in bogs or fens and approximately 22 of the species are generally found in prairie habitats. The remaining species inhabited various habitats such as dolomite bluffs, forests and flatwoods, and other wetland communities.
- **Insects**—The Illinois Endangered Species Protection Board identifies four listed species of insects as occurring in Lake County. Three of the insect species are state endangered, including the Karner Blue butterfly, and one species is state threatened. Three of the insect species are butterflies and one is a leafhopper.
- **Fish**—The Illinois Endangered Species Protection Board identifies nine listed species of fishes as occurring in Lake County. Four of the species are specific to Lake Michigan and would not be considered within the study area. The greater redhorse (*Moxostoma valenciennesi*—state endangered) is believed to be extirpated. The pugnose shiner (*Notropis anogenus*—state endangered), blacknose shiner (*Notropis heterolepis*—state endangered), blackchin shiner (*Notropis heterodon*—state threatened), tend to inhabit well-vegetated glacial lakes and clean streams. The Iowa Darter (*Etheostoma exile*) has been recently identified at a few sites in Lake County. The species have been observed near the IL 120/IL 21 interchange within an unnamed tributary to the Des Plaines River, in Bull Creek north of Libertyville, within two unnamed tributaries to the Des Plaines River between Libertyville and IL 120, within various lakes, and near Dilley Road in Mill Creek (Taylor and Wetzel 1999). The banded killifish (*Fundulus diaphanus*) is also found in clean glacial lakes that are vegetated.
- **Amphibians**—The Illinois Endangered Species Protection Board identifies only one listed species of amphibian as occurring in Lake County: the four-toed salamander (*Hemidactylium scutatum*—threatened). This species' habitat requirement is boggy woodland ponds, sphagnum areas adjacent to woodlands, and springfed headwaters of woodland streams.
- **Reptiles**—The Illinois Endangered Species Protection Board identifies four listed species of reptiles as occurring in Lake County. Two of the reptile species are snakes: the eastern massasauga rattlesnake (*Sistrurus catenatus*—endangered) and the Kirtland's snake (*Clonophis kirtlandi*—threatened). The Illinois mud turtle (*Kinosternon flavescens*) is listed as endangered. The Blanding's turtle (*Emydoidea blandingii*) has recently been listed as state threatened. Kirtland's snake prefers wet meadows, open swamp-forests, and wet vacant urban areas. The Massasauga rattlesnake prefers wet prairies, bogs and swamps, and rarely dry woodlands. The mud turtle is generally found near ponds in sand prairie areas. Blanding's turtles prefer marshes, prairie wetlands, sedge meadows, and shallow vegetated portions of lakes.
- **Birds**—The Illinois Endangered Species Protection Board identifies 26 listed species of birds as occurring in Lake County. Seven of the bird species are identified as threatened in Illinois. The remaining 19 species are identified as endangered. Appendix C lists the bird species identified as threatened or endangered species within Lake County.
- **Mollusks**—The Illinois Endangered Species Protection Board identifies one listed mussel species, the spike mussel

(*Elliptio dilatata*), as state threatened. This mussel is found in small or large streams with mud or gravel substrates.

Based on habitat considerations of the state listed species (Herkert 1991, 1994), a general assessment of species distribution was compiled to determine important areas for these species. Eight categories of habitat were derived from the habitat requirements of both threatened and endangered plant and wildlife species. The habitat categories are:

- Prairies/Grasslands
- Lake Michigan
- Bogs/Fens/Special wetland habitats
- Forest/Flatwoods
- Savannas
- General wetlands
- Streams
- Other

For each species, the habitat requirements were reviewed. Based on this general review, nearly two-thirds of the listed species present within Lake County use less common cover types for habitat. These cover types include bogs/fens/special wetland habitats, Lake Michigan, prairies/grasslands, and savannas. For example, ADID wetlands harboring threatened and endangered species are shown in Figure 2-17. Cover types more common to Lake County such as forest/flatwoods, general wetlands, streams, and others (which includes a variety of habitats including urban areas) provided habitats for approximately one-third of the listed species in the county.

Listed species found near Lake Michigan were most likely located within the protected areas of Illinois Beach State Park or near Fort Sheridan, which contains much of the remaining undisturbed dune and interdunal habitats in the county as well as intermittent ravine communities. Many of the bog and fen communities are located in the northern and western half of the county in areas closer to the Fox River/Chain O' Lakes. This would include areas such as Volo Bog and Tower Lakes Fen, among others. While prairie communities are scattered across the county,

many of the remnants are located within forest preserves or other protected sites.

Although savanna remnants are not as numerous as prairies, these features have generally been protected in preserves such as the Rollins Savanna Forest Preserve. Other known savanna sites include the Bull Creek Savanna and the Flint Creek Savanna. The Flint Creek Savanna was identified south of IL 22 and west of Lake Zurich (Amundsen 1998a). The Bull Creek Savanna is part of the nature preserve complex near Casey and Almond Roads (IDOT 1995).

The remaining habitat groups including the forests, general wetlands, stream, and others are located relatively uniform across the county. These areas are more likely to be affected by proposed transportation improvements.

The presence of threatened and endangered species of plants and wildlife generally coincide with areas designated as either nature preserves or INAI sites (Figure 2-18). Also shown in Figure 2-18 are seven clusters of sites that would potentially harbor endangered species. These include the Illinois Beach State Park, Antioch/Lake Villa area, Chain O' Lakes State Park, Volo Bog area, Wauconda area, Tower Lakes/Fox River area, and the Des Plaines River corridor.

The LCFPD indicates that ten forest preserve sites each contain six or more species. These are listed below with their closest associated designated lands cluster:

- Lakewood/Wauconda Bog—22 species, Wauconda Area
- Grant Woods—17 species, Volo Bog Area
- Ryerson Woods—Nine species, Des Plaines River Area
- Spring Bluff —Nine species, Illinois Beach State Park
- Fort Sheridan—Seven species, Lake Michigan
- MacArthur Woods—Seven species, Des Plaines River

- Sun Lake—Seven species, Antioch/Lake Villa Region
- Cuba Marsh—Six species, Wauconda Area
- McDonald Woods—Six species, east of Lake Villa Area
- Wadsworth Prairie—Six species, Des Plaines River Area

Additional studies conducted by INHS for various transportation projects enhance existing data on listed species. This includes limited potential habitat for plants in ravine communities along Lake Michigan (Taft 1997a); red-shouldered hawk surveys near Miller Road (Amundsen 1995); studies conducted along Old Rand Road in Wauconda near the Wauconda bog complex (Hill, INHS 2000); botanical surveys, which identified four listed plant species at a potential wetland mitigation site near US 41 and IL 137 (Taft 1996); and numerous surveys conducted along IL 22 for IDOT improvements (Amundsen and Enstrom 1996, Amundsen 1995, 1998a, 1998b, 1998c, and Taft 1997b). Additional INHS studies were conducted along the former FAP 342 right-of-way during previously proposed road improvement projects. These studies showed marginal habitat for seven listed bird species, with overall disturbed plant communities.

## 2.3.6 Special Lands

### 2.3.6.1 Protected Lands

Lake County contains numerous properties in the public domain that are managed and protected for their special resources. The county contains 41 forest preserves, two state parks, numerous local parks, 21 nature preserves, and 57 INAI sites (Figures 2-19 and 2-20). These areas provide open space and habitat for different types of plants and wildlife, including common species and threatened and endangered species that rely on this habitat for survival. Forest preserves and parks also provide recreational activities. However, nature preserves and natural areas are usually not developed for public access because they

contain sensitive habitats or unique flora and fauna. Some nature preserves and natural areas are privately owned and public access is prohibited. In cases where public forest preserves incorporate a nature preserve or natural area, access is limited or restricted to well-defined trails.

### 2.3.6.2 Forest Preserves

Of the 41 LCFPD sites, 18 sites occupy approximately 4,613 ha (11,400 ac) and are used for active recreation with trails and an array of activities. The remaining 23 forest preserve sites open to the public have no established recreational facilities, which total an additional 3,313 ha (8,187 ac). Total forest preserve lands account for approximately 7 percent of the total land area in Lake County. LCFPD sites are distributed among 12 of the 16 townships.

LCFPD provides trails for hiking, bicycling, cross-country skiing, horseback riding, and snowmobiling. All of the 18 forest preserve sites are used for recreational activities, and provide the same habitat for wildlife. Two regional trails managed by the LCFPD include the Des Plaines River Trail North and the Des Plaines River Trail South, which parallel the Des Plaines River through Lake County. The northern trail is about 17.7 km (11 mi) and the southern trail about 19.3 km (12 mi). There are plans to continue the two sections until the entire 53.1 km (33 mi) trail from the state line south to Cook County is complete.

The forest preserve system is described in accordance with its relationship to three watersheds in the study area, including the Fox River, Des Plaines River, and Lake Michigan watersheds. Figure 2-19 highlights the location of the forest preserve sites in the watersheds. There are approximately nine forest preserves, 19 nature preserves, and 26 INAI sites near the Fox River in Lake County. These areas account for almost half of the nature preserves and a third of the INAI sites within Lake County.

Five of the nine LCFPD sites have no services or facilities. Table 2-29 (on the following two pages) summarizes the size, function, and

TABLE 2-29

Lake County Forest Preserves and Associated Nature Preserves and Natural Areas

Name of Forest Preserve	Approximate Size, ha (ac)	Function <sup>a</sup>	Nature Preserve / Natural Area
<b>Fox River Watershed</b>			
Cuba Marsh <sup>b</sup>	316 (781) <sup>c</sup>	R	None
Deer Lake-Red Wing Slough	16 (40)	U	None
Fox River Forest Preserve <sup>d</sup>	123 (304) <sup>c</sup>	B, R, S	Lyons Prairie & Marsh and Farm Trails North
Gander Mountain	116 (287) <sup>b</sup>	U	None
Grant Woods <sup>f</sup>	394 (974) <sup>c</sup>	E, R, S	Gavin Bog and Prairie
Grassy Lake	234 (578) <sup>e</sup>	U	Tower Lakes Fen and Wagner Fen
Lakewood <sup>g</sup>	835 (2,063)	A, B, R, S	Wauconda Bog
Sunlake	215 (531)	U	None
West Loop Greenway	No Data	U	None
<b>Des Plaines River Watershed</b>			
Almond Marsh	124 (306) <sup>e</sup>	U	Almond Marsh and Oak Openings
Bannockburn	32 (79) <sup>e</sup>	U	None
Berkeley Prairie	7 (17)	U	None
Brae Lock Golf Course	65 (161) <sup>c</sup>	B, N, S	None
Buffalo Creek <sup>h</sup>	160 (395) <sup>c</sup>	R, S	None
Countryside Golf Course	200 (494)	B, S	None
Des Plaines River Trail	1,341(3,314) <sup>e</sup>	U	Wadsworth Prairie
Duck Farm	142 (351) <sup>c</sup>	S	None
Fourth Lake Fen	92 (227) <sup>c</sup>	U	None
Grainger Woods <sup>i</sup>	104 (257) <sup>c</sup>	H, S	Lloyd's Woods
Gurnee Woods	210 (519)	U	None
Independence Grove	448 (1,107) <sup>c</sup>	U	None
Lake Bluff	34 (84)	U	Skokie River
MacArthur Woods	255 (630) <sup>e</sup>	U	MacArthur Woods
McDonald Woods <sup>j</sup>	123 (304) <sup>c</sup>	R	None
Middle Fork Savannah	208 (514)	U	None
Old School	154 (381) <sup>c</sup>	U	None
Prairie Wolf Slough	174 (430) <sup>c</sup>	R, S	None
River Hill	90 (222) <sup>e</sup>	U	None
Rollins Savannah <sup>k</sup>	495 (1,223) <sup>c</sup>	S	None
Ryerson Woods <sup>l</sup>	223 (551) <sup>c</sup>	B, N, S	Edward I. Ryerson
Site 15	31 (77) <sup>e</sup>	U	None
Van Patten Woods	393 (971) <sup>c</sup>	R, S	None
Wadsworth Prairie	487 (1,203)	U	Wadsworth Prairie
Waukegan Savannah	279 (689) <sup>e</sup>	U	None
Wilmont	57 (141) <sup>e</sup>	U	None
Wright Woods/Half Day Woods <sup>m</sup>	81 (200) <sup>c</sup>	R, S	None

identifies threatened and endangered species in these areas.

There are 27 LCFPD sites within the Des Plaines River system from the Wisconsin border to the Cook County border. Where actual forest preserves are not present, the sites are mostly linked by trails along the river (Table 2-17). There are 10 nature preserves in the watershed. Of those, four are along the Des Plaines River and four are near the Skokie River.

There are four full forest preserves and one partial preserve, Spring Bluff, within the study area of the Lake Michigan Watershed. There are three dedicated nature preserves in the watershed, all of which are associated with Illinois Beach State Park. Table 2-17 summarizes the characteristics of the five forest preserves in the Lake Michigan Watershed. Two golf courses account for more than 200 ha (500 ac) of preserve holdings.

### 2.3.6.3 Parks

In addition to the Lake County forest preserve system, local and state park districts provide recreational opportunities, including picnic sites, playgrounds, and activities, such as biking, golfing, hiking, and canoeing, as well as passive recreation. There are numerous park districts in the study area, which are primarily municipal or township level districts. Figure 2-19 shows the location of the two state parks: Illinois Beach State Park and the Chain O' Lakes State Park. Combined, the parks draw an average of 3.5 million visitors annually.

### 2.3.6.4 Illinois Nature Preserves

IDNR defines a nature preserve is "an area of land or water in public or private ownership that is formally dedicated, pursuant to the terms of the law, to being maintained in its natural condition." A major objective of the

TABLE 2-29 CONTINUED

Lake County Forest Preserves and Associated Nature Preserves and Natural Areas

Name of Forest Preserve	Approximate Size, ha (ac)	Function <sup>a</sup>	Nature Preserve / Natural Area
<b>Lake Michigan Watershed</b>			
Greenbelt	226 (559) <sup>c</sup>	R, S	None
Fort Sheridan Golf Course	105 (105) <sup>c</sup>	S	None
Lyons Woods <sup>n</sup>	107 (264) <sup>c</sup>	R	None
Spring Bluff	94 (232)	U	Spring Bluff
Thunderhawk Golf Course	98 (242) <sup>c</sup>	B, S	None

Note: Unless otherwise noted, no data on threatened and endangered species was available to document presence

<sup>a</sup> A = Archives/ Historical Exhibits, B = Banquet/Meeting Facilities, E = Educational Activities, H = Horse Stables and Lessons, N = Nature Center, R= Recreational Opportunities, S = Sports, U= Undeveloped

<sup>b</sup> Cuba Marsh has 2 rare plant species, 3 state-listed endangered birds, and 1 county-listed endangered plant

<sup>c</sup> Data obtained from Lake County Forest Preserve District, *Map and Guide of Lake County Forest Preserve and Trail Maps*, October 1998.

<sup>d</sup> Fox River Forest Preserve has a bird rookery

<sup>e</sup> Data obtained from CH2M HILL, GIS Database 1999

<sup>f</sup> Grant Woods has 1 county-listed threatened plant and the only existing Kentucky Coffee Tree stand in Lake County

<sup>g</sup> Lakewood has 17 state-listed endangered plants or animals, and has a bat colony and breeding habitat for birds

<sup>h</sup> Buffalo Creek Nature Preserve contains important bird habitats

<sup>i</sup> Has 1 state-listed endangered plant

<sup>j</sup> Has 4 state-listed endangered animals

<sup>k</sup> Has 2 state-listed endangered animals

<sup>l</sup> Has 1 state-listed endangered plant, 2 county-listed endangered animals, 4 rare animal species and a high quality floodplain forest

<sup>m</sup> Has 1 state-listed endangered plant and has extensive oak and maple woodlands

<sup>n</sup> Lyons Woods has 3 rare bird species, 2 rare plant species, and large stands of oaks

nature preserve system is the preservation of adequate samples of all the significant natural features of the state, including threatened and endangered species. Natural features include geological and physiographic formations, soils, streams, lakes, and aquatic and terrestrial communities of plants and animals.

The Illinois nature preserve system consists of 291 preserves containing 15,751 ha (38,922 ac). In Lake County, there are 27 Illinois nature preserves totaling 1,893.8 ha (4,679.4 ac), or over 9 percent of Illinois' nature preserves (see Table 2-30). These preserves are distributed among 13 of Lake County's 16 townships (Figure 2-20). Their

TABLE 2-30

Lake County Nature Preserves <sup>a</sup> – Fox River, Des Plaines River, and Lake Michigan Watersheds

			Types of Habitat Present								
Name of Nature Preserve	Watershed <sup>a</sup>	Size ha (ac) <sup>c</sup>	Fen	Grassland Meadow	Lake Michigan Beach	Open Water	Prairie	Savannah	Sedge Meadow	Wetland	Woodland
Barrington Bog	F	16.6 (41.0)							X	X	
Cedar Lake Bog	F	11.1 (27.4)				X				X	
Farm Trails North	F	8.0 (19.8)	X						X		
Gavin Lake Bog and Prairie	F	42.5 (105.0)					X			X	X
Lyons Prairie and Marsh	F	105.0 (259.5)					X			X	
Pistakee/Brandenburg Bog	F	140 (346)							X	X	
Tower Lakes Fen	F	30 (74)									
Turner Lake	F	38.4 (94.9)	X	X		X	X			X	
Volo Bog State Natural Area	F	324.0 (800.6)				X		X		X	X
Wagner Fen	F	40.5 (100)	X				X			X	
Wauconda Bog	F	27.1 (67.0)								X	X
Almond Marsh	DP	44.5 (110.0)		X			X		X	X	X
Eastern Prairie Fringed Orchid	DP	1.5 (3.7)					X				
Edward L. Ryerson	DP	113.0 (279.2)									X
Florsheim Park (Lincolnshire)	DP	31.6 (78)					X		X		X
Highmoor Park	DP	4.2 (10.5)					X	X		X	X
Liberty Prairie	DP	19.0 (47.0)	X				X			X	
Lloyd's Woods	DP	42.5 (105.0)					X			X	X
MacArthur Woods	DP	180.5 (446.0)									X
Oak Openings	DP	6.5 (16.1)					X	X	X	X	X
Reed-Turner Woods	DP	13.4 (33.1)					X	X			X
Wadsworth Prairie	DP	71.2 (175.9)					X			X	
Hybernia	LM	10.9 (26.9)					X	X		X	
Illinois Beach	LM	335.5 (829.0)	X		X	X			X	X	
North Dunes	LM	80.9 (199.9)	X				X	X			
Skokie River	LM	40.4 (99.8)					X		X	X	
Spring Bluff	LM	115.0 (284.1)	X				X	X		X	
TOTAL		1,893.8 (4,679.4)									

<sup>a</sup> F= Fox River, DP = Des Plaines River, LM = Lake Michigan

<sup>b</sup> All these nature preserves contain at least one threatened or endangered plant or animal. Additionally, they all contain many uncommon or rare plant or animal species.

<sup>c</sup> Data obtained from the Illinois Nature Preserves Commission, 7/31/00 and Personal Communications February, 2001.

locations do not display an obvious pattern of distribution. Cuba and Libertyville townships contain the largest concentrations with three each.

LCFPD manages 764 ha (1,886 ac) of the Illinois nature preserves in the county; IDNR manages 830 ha (2,050 ac); and park districts, conservation groups, and private entities hold the remaining 300 ha (741 ac). Table 2-30 summarizes the watershed, acreage, and habitat of nature preserves for Lake County. These nature preserves are primarily located in or near forest preserves or state parks. Most of the nature preserves are located in western Lake County. The nature preserves contain a variety of habitat types from wetlands to prairies to woodlands.

### 2.3.6.5 Illinois Natural Areas

As stated in the Natural Areas Preservation Act, “natural area” is defined as “an area of land in public or private ownership which, in the opinion of the Commission, either retains or has recovered to a substantial degree its original natural or primeval character, though it need not be completely undisturbed, or has floral, faunal, ecological, geological or archaeological features of scientific, educational, scenic or esthetic interest.” These INAI sites are usually associated with a nature or forest preserve. Within the study area, there are 57 INAI sites (Figure 2-20). The natural areas in Lake County are distributed among 16 townships. Most of the natural areas are located in western Lake County. There are 28 INAI sites within the Fox River Watershed, 21 in Des Plaines River system, and eight in the Lake Michigan Watershed.

### 2.3.7 Visual Resources

Lake County is diverse in its natural and human environment and exhibits a variety of visual characteristics. The visual quality of Lake County can be characterized by two terms: vividness and intactness.

- **Vividness**—A memorable visual impression
- **Intactness**—Having a measure of naturalness

The shoreline area along Lake Michigan is dotted by mature communities that have a good balance between development and the natural resources of the area. This area provides strong relationships between landform and water, and the urban areas show strong identity in terms of their sense of community, architectural style, and sense of place. Amongst the patchwork of shoreline communities is the Illinois Beach State Park, and is located along the northern shore of the county. This sizeable piece of property is reasonably intact with extensive forested and wetland areas.

West of I-94 are natural resources, including lakes, wetlands, rivers, and streams. Remnants of the natural setting have been preserved by the LCFPD, the state, and other open space entities. Overall, the natural setting in this area has been altered by widespread suburban development. The northern parts of this area have topographic relief and landform that provide additional visual interest. Low density development in the northern parts of the county with natural features and topographic relief all combine to form an interesting pattern of countryside visual images that are intact.

The visual character in the central and southern part of the county is flat to slightly hilly terrain and is mostly in residential and agricultural uses. The steeper terrain occurs along the edges of major drainage ways. The terrain is broken up by urban uses in the many suburban communities and clusters of residences and subdivisions in unincorporated areas. There are small patches to extensive areas of woodlands, wetlands, grasslands, and other natural features throughout the area. Several older farmsteads and estates are visible at various locations. This area generally lacks the topographic relief as compared to the northern and western parts of the county. Waterforms are present throughout the area, but not to the extent as found in the northwestern area (Chain O' Lakes) and to the east with the Lake Michigan shoreline. Variations in pattern, color, and texture of vegetation are less diverse than other parts of the county. The vividness of the area, as defined by topography, waterform, and

vegetation is considered low to moderate. The most intact resources are the Fox and Des Plaines River corridors, which are also the locations of most of the county's forest preserves.

There are several prominent urban centers in central and southern Lake County, such as Libertyville, Long Grove, Lake Zurich, and Grayslake, that provide a sense of community, architectural style, and sense of place. These urban settings create a coherence and composition that creates integrity in visual quality. Overall, the study area has been heavily altered by human development. Residential subdivisions, commercial development, industrial development, and a variety of supporting infrastructure have altered the natural landscape. Over the years, a rather extensive system of forest preserves and other permanent public land trusts have retained some of the natural conditions of the area. The combination of a moderate level of urban development and the amount of public lands results in a low to medium degree of intactness in the area.

## 2.4 Air Quality

The study area is located within the Chicago metropolitan area. This area is in violation of the National Ambient Air Quality Standard (NAAQS) for the pollutant ozone. The area is classified as a "Severe" ozone non-attainment area and it includes the counties of Cook, DuPage, Kane, Lake, McHenry, and Will, Aux Sable and Goose Lake townships in Grundy County, and Oswego Township in Kendall County. Due to the non-attainment status of the area, the State of Illinois has developed a State Implementation Plan (SIP) identifying programs intended to reduce ozone precursor emissions. A "Severe" classification means that the region must implement specific programs to attain air quality standards by the year 2007.

A complete listing of the NAAQS are shown in Table 2-31 (on the following page). The primary standards are established at levels that are intended to protect the public health.

Secondary standards are required to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Ozone is a colorless gas with a pungent odor and is associated with smog or haze conditions. Ozone is not directly emitted into the atmosphere but is formed when precursor emissions, hydrocarbons, oxides of nitrogen, and carbon monoxide react in the presence of sunlight. Because of these complex relationships and the regional nature of ozone, estimating and controlling ozone formation requires factoring all hydrocarbon, oxides of nitrogen, and carbon monoxide emissions within the region and thus, the impact on ozone concentrations from individual projects or facilities cannot be observed in the immediate study area.

In addition to the SIP requirements, metropolitan planning organizations (MPO) are required to undertake conformity determinations on metropolitan transportation plans and transportation improvement programs before they are adopted, approved, or accepted. Section 176 (c)(4) of the Clean Air Act Amendments of 1990 requires that transportation plans, programs, and projects that are funded or approved under Title 23 U.S.C. must be determined to conform with state or federal air implementation plans. Conformity to an implementation plan is defined in the Clean Air Act as conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. The implementing regulations for determining conformity of transportation projects are found in 40 CFR Part 93, "Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs and Projects Funded or Approved under Title 23 U.S.C. or the Federal Transit Act." Highway or transit projects that are funded or approved by the FHWA or the Federal Transit Administration (FTA) must also be included in a conforming plan before they are approved or funded by IDOT or the Metropolitan Planning Organization (MPO).

Ambient air quality is monitored at 56 locations in the metropolitan Chicago region. The instrumentation used at each site varies, but all six criteria pollutants are monitored at one or more locations. The results of the monitoring are summarized and published annually by IEPA.

There are four monitoring locations in Lake County: Deerfield, Libertyville, and Waukegan that report on ozone, and the Zion station reports on nitric oxide, nitrogen dioxide, ozone, and VOCs. In 1999, all four monitoring locations reported no exceedances of the 1-hour for ozone. Table 2-32 (on the following page) lists monitoring data available at each of the locations, and Table 2-33 (on

the following page) provides a summary of air quality in the study area. The Pollutant Standards Index (PSI) for Lake County in 1999 was classified as good, 85 percent of the time, and moderate, 15 percent of the time.<sup>12</sup>

## 2.5 Noise

Sound is caused by the vibration of air molecules and is measured on a logarithmic scale with units of decibels (dB). Sound is composed of a wide range of frequencies; however, the ear is not sensitive to all frequencies. The “A” weighted scale was devised to correspond with the ear’s sensitivity,

**TABLE 2-31**  
Summary of National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary	Secondary
<b>Particulate Matter</b>			
10 micrometers (PM <sub>10</sub> )	Annual Arithmetic Mean 24-hour	50 µg/m <sup>3</sup> 150 µg/m <sup>3</sup>	Same as Primary Same as Primary
2.5 micrometers (PM <sub>2.5</sub> ) <sup>b</sup>	Annual Arithmetic Mean 24-hour	15 µg/m <sup>3</sup> 65 µg/m <sup>3</sup>	Same as Primary Same as Primary
Sulfur Dioxide (SO <sub>2</sub> )	Annual Arithmetic Mean 24-hour 3-hour	0.03 ppm (80 µg/m <sup>3</sup> ) 0.14 ppm (365 µg/m <sup>3</sup> ) None	None None 0.5 ppm (1,300 µg/m <sup>3</sup> )
Carbon Monoxide (CO)	8-hour 1-hour	9 ppm (10 µg/m <sup>3</sup> ) 35 ppm (40 µg/m <sup>3</sup> )	Same as Primary Same as Primary
Ozone (O <sub>3</sub> )	1-hour/Day <sup>a</sup> 8-hour/Day <sup>b</sup>	0.12 ppm (235 µg/m <sup>3</sup> ) 0.08 ppm	Same as Primary Same as Primary
Nitrogen Dioxide (NO <sub>2</sub> )	Annual Arithmetic Mean	0.053 ppm (100 µg/m <sup>3</sup> )	Same as Primary
Lead (Pb)	Quarterly Arithmetic Mean	1.5 µg/m <sup>3</sup>	Same as Primary

Note: All standards with averaging times of 24 hours or less are not to have more than one actual or expected exceedance per year.

<sup>a</sup> The 1-hour ozone standard pertains only to Cook, DuPage, Kane, Lake, McHenry, and Will counties, Aux Sable and Goose Lake townships in Grundy County, and Oswego Township in Kendall County in the Chicago area; and to Madison, Monroe and St. Clair counties in the Metro-East St. Louis area.

<sup>b</sup> The ozone 8-hour standard and the PM<sub>2.5</sub> standards are included for information only. These standards were proposed by the USEPA in 1997 and have been the subject of litigation. The U.S. Supreme Court issued a ruling upholding the standards on February 27, 2001. However, that ruling found the USEPA’s implementation policy unlawful and remanded the case to the USEPA to “develop a reasonable interpretation of the nonattainment implementation provisions insofar as they apply to revised ozone NAAQS.”

<sup>12</sup> The IEPA issues the PSI for areas or sectors. The areas correspond to metropolitan areas with a population greater than 200,000.

and sound levels are measured as dBA on this scale. Highway agencies use a 1-hour equivalent sound level,  $L_{eq}(h)$ , as a descriptor of noise levels. Studies show that a change of 3 dBA is a barely perceivable change in noise. Table 2-34 (one the following page) indicates that an increase of 10 dBA will be perceived as being twice/half as loud.

## 2.5.1 Noise Sources and Existing Conditions

Highway noise from cars is associated with the interaction of tire treads on the pavement. Heavy truck noise consists of engine noise, engine exhaust noise, and tire noise. As an example, truck engine noise alone usually falls in the range of 75 to 85 dBA (at 15.25 m, or 50 ft, from

the source); engine exhaust noise (at 15.25 m, or 50 ft) usually falls in the range of 90 to 100 dBA without mufflers or in the range of 80 to 90 dBA with a good muffler system; and finally, tire noise falls within the range of 75 to 90 dBA (USDOT 1993).

The height of the noise source also contributes to the noise level. For example, the average height of a truck is about 3 m (10 ft), and the truck exhaust stack can range from 2.4 to 3.7 m (8 to 12 ft) high. Therefore, the relative height of the truck noise source requires higher noise barriers for effective mitigation, especially when trucks comprise a significant source of the noise.

Noise levels vary with land uses and population density. Urban settings with higher densities

TABLE 2-32  
Air Quality Monitoring Sites in the Study Area

Monitoring Location	Owner/Operator	Air Monitor Network	Pollutant Measured
Deerfield	IEPA	NAMS	Ozone
Libertyville	IEPA	SLAMS, SPMS	Ozone
Waukegan	IEPA	NAMS, SPMS	Ozone
Zion	IEPA	PAMS	Ozone, Nitric Oxide, NO <sub>2</sub> , VOC

SLAMS – State/Local Monitoring Station

PAMS – Photochemical Assessment Monitoring Site

SO<sub>2</sub> – Sulfur Dioxide

NAMS – National Air Monitoring Station

SPMS – Special Purpose Monitoring Station

NO<sub>2</sub> – Nitrogen Dioxide

VOC – Volatile Organic Compound

TABLE 2-33  
Existing Air Quality in the Study Area

Pollutant Name	Status (1999)
PM <sub>10</sub>	No sites exceeded the primary annual standard for PM <sub>10</sub> .
Ozone	There were no exceedances of the 1-hour standard in the Chicago area.
Sulfur Dioxide	There were no exceedances of the 24-hour primary standard or the annual primary standard recorded in Illinois.
Nitrogen Dioxide	There have been no violations of the annual primary since 1980 in Illinois.
Lead	There were no violations of the quarterly primary standard recorded in the region.
Carbon Monoxide	There were no exceedances of either the 1-hour primary standard or the 8-hour primary standard in the region.

Source: IEPA 2000a

have higher noise levels. Newport Township in northern Lake County has the lowest population density (2,486 people per km<sup>2</sup>, or 960 people per mi<sup>2</sup>). The highest population density (24,864 people per km<sup>2</sup>, or 9,600 people per mi<sup>2</sup>) occurs in the more urban Waukegan Township. Figure 2-21 defines typical noise levels according to population density. Table 2-35 gives the estimated existing noise exposure for general assessment.

The LCTIP also defined traffic related noise conditions in the study area by developing a set of typical traffic noise level conditions for representative roadway types including freeway/tollways, arterial roadways, and other local roads. Typical traffic noise levels generated from these roadway types are shown in Figure 2-21. For each roadway type, traffic noise levels are shown for a high and low traffic volume at distances ranging from about 15.2 m (50 ft) to 152 m (500 ft) from the edge of the roadway. This data shows how distance, traffic volume, and speed affect noise levels in areas near the roadway. Generally, at distances within 97.5 m (320 ft) from a freeway/tollway,

noise levels begin to exceed accepted noise criteria for residential units. That distance is about 36.5 m (120 ft) for arterial facilities and about 18.3 m (60 ft) for local roads.

The method for developing the information in Figure 2-21 employed the use of the Traffic Noise Model (TNM), an approved FHWA model for conducting highway noise analysis. Based on defined roadway conditions (i.e., traffic volume, traffic mix, and traffic speed), the TNM look-up tables were used to determine the typical noise levels at various distances for the representative roadways. The traffic inputs were characterized as:

- A typical peak hour traffic range derived from the LCTIP travel demand model.
- A traffic mix defined as 95 percent automobiles, 3 percent heavy trucks, and 2 percent medium trucks for each roadway type.
- Travel speed for each roadway type consisted of 60 mph for freeways/tollways, 45 mph for arterial facilities, and 35 mph for local roads.

TABLE 2-34  
Perceptive Noise Level Changes

Sound Level Change	Relative Loudness
±3 dBA	Barely perceptible change
±5 dBA	Readily perceptible change
±10 dBA	Twice/half as loud or quiet

TABLE 2-35  
Estimating Existing Noise Exposure for General Assessment

Population Density (people/mi <sup>2</sup> )	L <sub>eq</sub> Day	L <sub>eq</sub> Evening	L <sub>eq</sub> Night
1–100	35	30	25
100–300	40	35	30
300–1,000	45	40	35
1,000–3,000	50	45	40
3,000–10,000	55	50	45
10,000–30,000	60	55	50
Over 30,000	65	60	55

Source: FTA 1995

## 2.5.2 Noise Criteria for Determining Impact

The FHWA Title 23 Code of Federal Regulations (23 CFR 772) has developed guidelines, noise abatement criteria (NAC), to assess potential noise impacts. This criterion considers appropriate noise levels based upon land use activity. For example, the noise abatement criterion for a residence is 67 dBA. A traffic noise impact occurs when noise levels approach or exceed the NAC for the defined land use activity, or if a substantial increase in predicted noise level occurs even though the applicable NAC has not been reached. Table 2-36 describes the noise abatement criteria for varying activities.

## 2.6 Cultural Resources

The cultural resources for this study were assessed using existing and available data and limited field investigation for standing

structures along the build alternatives. This assessment was intended to identify potential cultural resources likely to be involved, and to inform resource agencies and others of the potential involvement. Pursuant to the National Historic Preservation Act of 1966, as amended, it is fully recognized that further definition of the impacts and coordination with responsible jurisdiction agencies is necessary to determine the level of impact, if any, and appropriate mitigation in future phases of work.

### 2.6.1 Archaeological Resources

A review of previous archaeological resource investigations and known archaeological sites in Lake County was conducted to address the location, character, and significance of archaeological resources to provide general information about those resources which may be potentially significant. The review was based solely on records research and involved no systematic fieldwork.

TABLE 2-36  
Noise Abatement Criteria Hourly Weighted Sound Level

Activity Category	$L_{eq}(h)^*$ , dBA	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	—	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

\* $L_{eq}(h)$ : The hourly value of  $L_{eq}$ .  $L_{eq}$  is the equivalent steady-state sound level, which in a stated period of time contains the same acoustical energy as the time-varying sound level during the same time period. When measuring or predicting noise levels, a receptor is assumed to be at ear height, located 1.5 m (5 ft) above the ground surface.

Use of interior noise levels shall be limited to situations where exterior noise levels are not applicable (i.e., where there are no exterior activities to be affected by traffic noise, or where exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities).

Note: NAC are noise impact thresholds for considering abatement. (Abatement must be considered when predicted traffic noise levels for the design year approach [i.e., are within 1 dB] or exceed the noise abatement criteria, or when the predicted traffic noise levels are substantially higher [i.e., are more than 14 dB] greater than the existing noise level.) The NAC are not attenuation design criteria or targets. The goal of noise abatement measures is to achieve a substantial reduction in future noise levels. The reductions may or may not result in future noise levels at or below the NAC.

Source: IDOT 2000a

Western and central Lake County is a kame and kettle environment. Recent studies indicate that this environment may contain some of the oldest evidence of human occupation in the Upper Midwest and North America. The associated stone tool producing industry represents a unique and important development in populating the New World. Large game animals predominated the resources sought by small, mobile hunting parties. Before this time, the advance of the Wisconsin ice sheet made the region inhospitable to human occupation.

Because of rapid development over the last 10 years, large parts of the county have been investigated for archaeological resources. The background literature review revealed that 624 previously recorded archaeological sites are in Lake County. Roughly 77 percent of the archaeological sites are prehistoric, 22 percent are historic, and 1 percent are multicomponent, consisting of both prehistoric and historic affiliations.<sup>13, 14, 15</sup> Thirty mounds, graves, burials, or cemeteries are included in these percentages.

Areas containing high probability for archaeological finds include elevated topography near large bodies of water, beach terraces surrounding relict and existing lakes, terraces along the major river ways, uplands at the heads of tributaries, and along old Native American trails or plank roads (see Figure 2-22). These areas were identified using the Illinois State Museum model, which is GIS-based. The Des Plaines River at Half Day Road is the location of a historic and prehistoric Native American village. The pattern of major Native American sites continues in a southern direction ending in the Portage Site, located outside of the study area in a Cook County forest preserve. In general, the

number of significant sites per acre decreases in the area bounded by Lake Cook Road, US 41, IL 120, and US 12 (this is the area that encompasses the majority of the proposed transportation improvement alternatives). A review of the background literature reveals that there is a total of 168 known archaeological sites within the area bounded by Lake Cook Road, US 41, IL 120, and US 12. Roughly, 57 percent of the archaeological sites are prehistoric, 39 percent are historic, and 4 percent are multi-component consisting of both prehistoric and historic affiliations.

## 2.6.2 Standing Structures

Settlement in Lake County began in 1834 when Daniel Wright constructed a log cabin by the Indian village of Half Day, which was located in the Vernon Township. The next year, a small wave of pioneers constructed several mills and farms along the Des Plaines River and its tributaries. Settlement also occurred along the Lake Michigan shoreline and the Fox River Valley.

The 1840s were a period of rapid growth for Lake County. Most residents engaged in farming in the inland townships. Small agricultural support centers emerged at crossroads or mill sites to provide the farmers with market access and necessary goods and services. Many of these hamlets declined or virtually disappeared when they were bypassed by railroads, although they were often replaced by new communities that emerged around a railroad station. Chicago's growth spilled into Lake County during the 1860s, when Walter S. Gurnee acquired 405 ha (1,000 ac) near the small lakeside community of Port Clinton, divided it into lots, and marketed the tracts to Chicago's wealthy, naming his development Highland Park. Boasting an excellent rail connection with downtown Chicago, Highland Park was incorporated as a city in 1867. Suburbanization continued moves north along the Chicago & Northwestern rail line during the late 1800s, consuming large sections of the townships of Deerfield and Shields.

Scenic lakes are scattered throughout Lake County's northwestern quadrant. Known as the Chain O' Lakes region, this area consists of a

<sup>13</sup> Prehistoric: Evidence of human occupation beginning as far back as 13,000 B.P. (before present) to as recently as 300 B.P. (before present).

<sup>14</sup> Historic: Evidence of human occupation beginning in the 1600s to the present. Note, there is a gray area of overlap between prehistoric and historic. This gray area is precontact and postcontact.

<sup>15</sup> Multi-component: Evidence of human occupation that consists of cultural material from prehistoric and historic peoples. It also can span over several time periods within the prehistoric or historic time frames.

series of lakes connected by the Fox River. Some time after the Civil War, railroads began to transport sportsmen to the region in order to fish and hunt waterfowl. As additional railroads penetrated the area from Chicago, a number of lakeside resorts opened to provide a summer escape for city dwellers. Lake County's resort industry thrived until the advent of the automobile changed vacationing habits, forcing many resort owners to subdivide their land and promote summer cottage developments during the 1920s.

Following World War II, Lake County experienced tremendous growth. By 1950, the townships of Benton, Fremont, Grant, Lake Villa, and Wauconda doubled in population, while the Township of Avon witnessed a 300-percent increase. Villages and cities annexed substantial sections of land; however, such growth could not be accommodated within existing communities. As a result, a large number of new municipalities organized until a 1969 law created more stringent incorporation standards. Currently, all or parts of 52 incorporated municipalities exist within Lake County.

IHPA files, National Register of Historic Places (NRHP) listings, IDOT's historic structures database, local historical societies, and other local organizations were referenced to provide general information about potentially significant historic structures. Many of the inventoried resources were catalogued in the 1970s, so it is possible that some of the structures are no longer standing.

More than 80 percent of the potentially significant historic structures in Lake County are located along the lakeshore communities, east of I-94. However, major clusters of the surveyed buildings, west of I-94, can be found in Antioch, Barrington, Fox Lake, Grayslake, Lincolnshire, Lake Villa, Lake Zurich, Libertyville, Long Grove, Mundelein, and Wauconda. Within the county, there are seven NRHP historic districts and 55 individual NRHP structures, 85 percent of which are in the lakeshore communities east of I-94. The only communities containing several NRHP sites within the area bounded by Lake Cook Road, US 41, IL 120, and US 12 (the area most likely to be affected by transportation

improvements) are Libertyville with four structures and Barrington with one historic district and one individual structure. There are 97 IHPA/landmark sites within the county.<sup>16</sup> About half are located in the lakeshore communities (east of I-94) and half throughout the rest of the county. The IHPA 1974-1977 survey identified 1,977 properties in Lake County, 80 percent of which were in the communities east of I-94.<sup>17</sup> IDOT's compiled inventory identified another 422 potential historic structures, 80 percent of which are located east of I-94.<sup>18</sup> Finally, the IHPA historic site files had information on 27 potential sites west of I-94 (files were not reviewed for communities east of I-94 as no proposed roadway improvements exist in those areas).<sup>19</sup>

## 2.7 Special Waste

Five regulated substance site classifications have been identified within Lake County that could be potentially involved with the project improvements:

- **Leaking Underground Storage Tanks (LUSTs)**—These records contain an inventory of leaking underground tank incidents.

<sup>16</sup> The "IHPA 1975 County Landmark Survey" included those properties in the county that IHPA surveyors thought had countywide historical significance. It is important to understand that these are not county-designated sites.

<sup>17</sup> The "1974-1977 Sprague Survey" focused primarily on historic resources found in incorporated communities, although occasional rural properties were noted.

<sup>18</sup> IDOT District 1 compiled an "Inventory of Historic Structures: Lake County" during the 1990s, by requesting information from local organizations regarding all potential sites (including NRHP, NRHD, etc). Although the District 1 compilation is not a comprehensive listing of all historic structures in the county, many of the properties it identified were also noted in other various collections reviewed. However, some structures recorded in this listing were not observed elsewhere. This total reports properties only identified in the District's catalog, not those that were counted in another survey.

<sup>19</sup> The "IHPA Historic Site Files" are a collection of folders in which miscellaneous material about various historic properties had been collected over the years.

- **Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)**—The sites that have been reported to the USEPA by states, municipalities, and private sources, pursuant to Section 103 of the CERCLA. CERCLIS contains sites that are on the National Priority List (NPL) and those under consideration for inclusion on the NPL.
- **National Priority List (NPL)**—Also known as Superfund, this database is a subset of CERCLIS and identifies sites for priority cleanup under the Superfund program.
- **State Hazardous Waste Sites (SHWS)**—These records parallel the State of Illinois to CERCLIS. They may also be a part of the federal CERCLIS list.
- **Corrective Action Report (CORRACTS)**—This is a list of handlers with Resource Conservation and Recovery Act Corrective Action Activity. This report shows corrective action core events that have occurred for every handler that has had corrective action activity.

A preliminary check of Lake County special waste sites was performed in 1998 by a database search service. Both federal and State of Illinois records were searched, but no field reviews or testing were performed.

About 750 LUST sites are identified within the Lake County (Figure 2-23). The concentration of LUST sites in the far eastern portion of the county, east of I-94, is substantially higher than in most other areas. Approximately half of the sites are located east of I-94, within less than one-quarter of Lake County. These sites are relatively evenly distributed, with a slightly higher concentration in the vicinity of Waukegan. West of I-94, noticeable concentrations of LUST sites can be identified in Lake Zurich, Barrington, and Libertyville, with additional sites distributed throughout the county. According to the data records, most LUST sites are associated with gas stations and

vehicle maintenance facilities, which tend to be located along major arterial roadways.<sup>20</sup>

Nineteen CERCLIS sites are identified within Lake County: 11 in North Chicago and Waukegan, three near Grayslake, two in Wauconda, and one each in Lake Forest and Antioch. Five NPL sites are included in the CERCLIS list. Three of these are in Waukegan, within 0.8 km (0.5 mi) of Lake Michigan, and the other two sites are in Antioch and Wauconda. Twelve SHWS are identified within Lake County; some designated sites are also on the CERCLIS list. As with the CERCLIS sites, most (eight) are in North Chicago and Waukegan. The remaining four are located in Lake Forest, Deerfield, Wauconda, and Antioch. There are 21 CORRACTS sites identified within Lake County. Sixteen of the sites are east of I-94. Ten of the eastern sites are located between Waukegan and Lake Bluff. The remaining five CORRACTS sites are in Barrington, Mundelein, Hainesville, Round Lake, and Fox Lake.

<sup>20</sup> IDOT has performed property site assessments for over a decade. IDOT's data shows that a database check/search only discovers about 50 percent of the UST locations in a study area, the other 50 percent are discovered by a site visit and interviews with residents. Of that 50 percent, 30 to 50 percent are unreported LUSTs.